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I. Industry Evolution and Analysis

1. October 22 – Dominant Design, Paradigm, and S-Curves – NYT (Article), Technology Cycles (Article)

- Key inter-relationship – firm + market + technology
- Industry evolution – evolution follows an S-curve
 - from – product to process innovation; functionality to volume / standardization; flexibility to control
 - consider – we only know successes b/c failures not well documents
 - hugging / NE strategy – when firm stays on same S-curve; can't move to next S-Curve
- dominant design ~ **paradigm** ~ product / service w/ clear identity; standard taken for granted and widely diffused
 - derives from culmination of products and processes
 - **path dependence** – small, random events at crucial moments drive tech choices that hard / expensive to change (best design <> always win (~QWERTY keyboard))
 - perceived slight advantage → wide spread adoption → casts fall → dominance rises (VHS v. beta)
 - risk ~ lock in to what proves the lesser technology
 - solution – slow down / think before setting standards / let competitors show their stuff
- Influential factors – regulation / legal + politics + value chains + networks (complements) + socio economic factors + product / service attributes + cultural + institutional + marketing
- substitution – occurs when firms sticks to existing dominant design and can't jump to new S-curve

- new products often launched by firms O/S industry
- new technology creates new markets (penetration often begins w/ tiny sub-markets)
- Key Examples – Swiss watch industry + wooden sailing ship + tennis rackets + airplane design and landing gear + horse buggies + typewriters + QWERTY typewriter + VHS v. beta

II. Inertia – being stuck and breaking out

2. October 27 – Industry Inertia - Kodak (Case A) and Disruptive Technologies (Article)

- problem - Investing heavily in current technologies to stay close to customers causes companies to miss new technologies
- why – new technology usually involves non-traditional performance attributes (customer preferences eventually evolve to appreciate these attributes) + mgmt keeps doing what worked in past (can't rationalize near term losses on new technology) + focus on customer voice (myopic to customer direction)
 - **performance trajectory** – rate at which product performance has / is expected to improve
 - **sustaining technologies** – maintain a performance trajectory (i.e., the extend the S-curve)
 - **disruptive technologies** – introduce new attributes + often perform worse in some dimensions + often only used / valued in new markets + may allow the emergence of new markets + gain traction through the introduction of new sustaining technologies
- solution – management create organizations that are adept at spotting new technologies to meet customer needs (even when customers don't recognize those needs)
 - Bower / Christensen argue that need independent organizations to be able to see new technologies
- how –
 - **i)** determine whether a new technology is disruptive or sustaining
 - **ii)** define the strategic significance of any disruptive technology (ask the right people the right questions - lead customers are good at assessing sustaining technologies BuT generally inaccurate in assessing disruptive technologies) – **will new technology ever surpass the old technology?**
 - **iii)** locate an initial market for the disruptive technology – no market research will exist; mgmt must create info
 - **iv)** responsibility for developing disruptive technology should be in independent organization IF the technology has a lower profit margin
 - **v)** keep the new organization independent – do not re-integrate or the technology risks being buried + parent corp must be willing to let some divisions (even old ones) die
- photography and the digital threat –
 - digital meant Kodak giving up core competencies and entering an industry w/ lower barriers to entry
 - digital represented little immediate threat b/c - it offered many features not appreciated by customers (no need for film, ability to edit photos) + no hard copy available + short battery life + incompatible file formats
 - the information revolution provided many sustaining technologies that accelerated the relevance of digital
 - Kodak's historic strategy ~ razor and blade (make their real money on film & processing)
 - Kodak's responses to digital – Photo CD (really this just lengthened film's S-curve) + Picture CD + Advanced Photo System (APS)
 - Industry evolves – non-traditional entrants, include Sony, et al who introduce proprietary technologies that lever other devices they produce
 - Kodak's mis-steps – resists giving up cash cow to move to new paradigm + ignored non-traditional competitors +
- Profs key takeaways –
 - who is in the industry? use value chain + consider the complements
 - firms, as knowledge repository, co-evolve with dominant designs BUT eventually face the risk of inertia
 - **dominant design** ~ **paradigm** ~ result of products + processes
 - **is dominant design modular (stereo) or architectural (silo mentality of GM door & ignition locks) phenomenon**
 - **ambidexterity** ~ bridging old and new ~ resolving the paradox of innovation strategy
 - analysis involves considering → firm + industry (boundaries, SIC) + external conditions (Porter, value chain) + competition (who are key players) + trends
 - **convergence** ~ linking between firms (consider if occurs within / outside your space) – driven by substitution / complementarity

- **network effects** ~ reinforce the S-curve
 - direct effects ~ greater number of consumers means greater design utility
 - indirect effects ~ complementary innovations enhance design utility
- Other terminology
 - **framing** ~ producers view problem of users as fitting the solution
 - **enrollment** ~ build toward a tipping point and get others to join the bandwagon
 - **standards** ~ components that define the paradigm (other components are merely peripherals)
 - **interoperability** ~ compatibility of products
 - **imagination** ~ ability to see beyond current markets and value chains

3. October 29 – Inertia in Old and New Firms – GM (Case), Seafax (Case), and Disruptive Technologies: Catching the Wave (Article)

- class notes - see Class 2

4. November 3 - Breaking Firm Inertia – Gunfire at Sea (Case) Core Capabilities and Rigidities (Article)

- paradox – core capabilities can also represent core rigidities (a knowledge based view of the firm)
 - **core capabilities** – differentiate a company strategically + constantly evolving + institutionalized (taken for granted) + **exists along ALL FOUR of following dimensions ...**
 - **knowledge & skills** – embodied in people + derives from products + is pervasive technical literacy
 - **technical systems** – codification / structuring / accumulating tacit knowledge of people over year (the artifacts left behind by EEs having knowledge & skills)
 - **mgmt systems** – formal / informal ways of creating knowledge + evolve over time in response to EEs interpretation of their organizational roles
 - **values and norms** – value assigned throughout organization to content / structure of knowledge + empowerment of members + visibility / status of dominant discipline +
 - **core rigidity** – deeply embedded knowledge sets that inhibit innovation & ability to fill gaps + internal consistency that makes evolutionary adaptation nearly impossible
 - **knowledge & skills** – lack of needed expertise
 - **technical systems** – when unaware of how many areas being affected by decisions made elsewhere
 - **mgmt systems** – difficult to change career path when project needs new / strong leadership
 - **values and norms** – empowerment becomes entitlement (psycho K) + low status / non-dominant design limits potential for contribution (consider reporting lines) + expectations become self-fulfilling
 - navy (Gunfire at Sea) – bravery + hierarchy + “courage” of navigating to get broadside
 - **resource dependency theory** – person w/ resources valued in organization has authority
- corporate survival - requires mgmt to effectively manage evolution of core capabilities + response occurs in 4 ways ...
 - **abandonment** – mgmt gives up as can't resolve rigidities
 - **recidivism** – future “innovations” continue to resemble / function as the dominant design
 - **re-orientation** – relocate a project to division where rigidities are less constraining
 - **isolation** – separate new project from existing organization
- profs takeaways –
 - new ideas come from the trenches + new ideas often conflict w/ current knowledge pool
 - often takes outsider to break inertia
 - Intrapreneur - shapes strategies + gives rise to new capabilities
 - innovation ~ from creative use of existing technology (not always through R&D) ~ Gunfire at Sea
 - old paradigm is strongly tied to organization culture and power
 - leadership role ~ unlock system

5. November 5 – Breaking Industry Inertia – Siemens (Video), Bell Western Union (Case) and How Established Firms Respond (Article)

- risk – new technology arises that threatens an existing firm's existence + myopia of existing firm

- **competence destroying tech** – so fundamentally different that tech capabilities of old product irrelevant to new tech
- **myopia** – lack of imagination; inability to see beyond current markets and value chains
- **situation** – old firm has oppor to use new tech + new firm(s) can commercialize some new innovation + new tech has new capabilities not associ. w/ old product + new tech leads to new industries that attracts new competitors from other industries
- **typical development of new industry** → much uncertainty + transient success
 - **i)** crude products + lack of complements + need for patience +
 - **ii)** eventual rapid g such that growing demand limits competitive pressures w/i new industry + no clear success formula / dominant design + rapid tech / product / mfr process evolution
 - **iii)** cut throat competition as g subsides + need for strong R&D / financing to remain competitive + old marketing skills less relevant
- **solution** – appraise new tech / industry likely to develop (consider wider ecology of society and new industry's place w/i it) + assess value of participating + find right strategy
 - **solution to myopia** – outsider sees opportunity (Bell saw for telephone)
 - **strategic issues for participating** –
 - **timing of entry** – evidence shows early entry leads to more positive results + hurdle of assessing unproven tech
 - **risks** – defining business too narrowly + entering too tentatively (aborting early)
 - **magnitude of commitment** – consider how new entrants will drive industry / product change / vision + can old firm use / bene from new firms products +
 - **risks** – falling behind if delay major commitment until uncertainties resolved + protecting old product base at expense of developing new base + underestimate ability of new entrants to overcome tech hurdles + entering w/o ability to advance the new product performance / functionality / etc.
 - **amt of org separation** – need decision makers committed to new tech (not worried about cannibalization) + may need to violate old orgs conventional wisdom
 - **risks** – focus too much on EoS avail. if keep new ops in old org + fear of cannibalization / obsoleting existing investments + undersponsorship of new entity by sr. mgmt
 - **competitive strategy** – consider possibility of new ways of competing + new distribution channels + greater product reliability makes service less of competitive factor + new entrants more likely to P compete + consumer use patterns change
 - **risks** – drawing on old firm's conventional wisdom when not relevant
 - **alts** – wait until uncertainties resolved + focus on niche markets +
 - **hedging** – create absorptive capacity / real options for substitute tech. and other skills
 - **positioning** – take some presence in new markets ~ MI + strat Alliance + licensing + other external hybrids
- **e.g.** – telegraph / telephone (Bell Western Union / AT&T) + wireline v. wireless

6. November 10 - Strategic Management of Information – Dupont (Speaker)

- **general issues**
 - **define success** – e.g., better than avg performance
 - **venturing** ~ a growth strategy + an implementation strategy
 - **venture team** – find new business + start rev stream w/i 12 mos + no acquisition + low investment
 - **how?** study trends + review corp product line + research pipeline/ skills / capabilities + identify business concept (3 mos) + develop concept into viable plan (6 mos) + implement if approved (3 mos)
 - **business model issues** – market access + market position + infrastructure + internal / external alliances
 - **consider** – corp culture (DuPont is very much a do it yourself organization)
 - **e.g.** – fuel cells + distance learning

III. Strategic Options to Move to a New Paradigm

7. November 12 – Internal and External Hybrids for Making Paradigm Shift – Oticon (Case), The Spaghetton Organization (Article), and Innovation: The Race to Learn with Partners (Article)

- why innovate? competitive advantage + maintain org + grow
- how innovate? internally + through partnerships (ESI ~ early supplier involvement)
 - vertical integration – important for product innovation
 - dimensions of effective p'ship – power + structures + formality (intellectual investments, expected outputs, confidentiality, & pricing) + communication + risks & returns
- organizational economics ...
 - **external hybrids** – market exchanges infused w/ elements of hierarchical control
 - **e.g.**, - spin-offs + carve-outs
 - **pros** – better incentive properties (than internal hybrids)
 - **cons** – hold-up risks
 - **internal hybrids** – hierarchical forms infused w/ elements of market control
 - **spaghetti organization** – flat, project based organization + multi-job concept + extensive delegation of decision rights
 - **fundamental features** – eliminate functional dept + new info tech systems to facilitate info sharing + eliminate office concept + develop corp value base stressing personal responsibility to increase intrinsic motivation + eliminate titles + **intrepreneurship**
 - **knowledge based** ~ knowledge centers connected by multiple non-hierarchical links
 - **anthropocentric** ~ designing jobs to fit individual persons capabilities and needs
 - **structural ambiguity** – deliberate engineering of freedom and ambiguity in roles and authority
 - **decision-making rights** – project initiation + ratification + implementation + monitor / evaluation
 - **results** – improved use / production of knowledge (ST) + better financial g (MT) + product development time drops +
 - **benes** – fewer layoffs + less legally complex + less risk to corp being taken advantage of by outsiders + better allocation of decision rights to those w/ relevant knowledge + achieve specialization efficiencies (functional org) w/ independence that facilitates sharing resources / capabilities (matrix org) +
 - **Oticon failures** - eliminate tournaments as performance incentives + eliminate specialization advantages + coordination difficulties (committing EEs and ensuring attention) + greater reliance reputation mechanisms + competition for corp resources limits knowledge sharing + proliferation of influence activities
 - **influence activities** – subordinates act to influence superiors decisions to benefit themselves
 - direction may be less costly than instruction / jt decision making (BUT mgmt may have < info)
 - **challenge** ~ **selective intervention** – superior committing to policy of non-interference (b/c authority must always reside at top)
 - **propositions** –
 - if violate internal patterns of complementarity → more problems w/ selective intervention
 - flatter org ~ more motivation / incentive problems due to selective intervention
 - more selective intervention required in turbulent industry than tranquil industry
 - **solutions** – informal delegation + commit to being ignorant + make harmful to interfere
 - **complementarities** (b/w org elements) – exist when increasing one element increases marginal return of others
 - note – it is inefficient to change system of complements in an incremental manner
- Prof takeaways
 - collocation of knowledge w/ decision & income rights c/b beneficial
 - **control** is key - innovators need BALANCE of freedom and discipline
 - **bureaucratic** ~ formal ~ timesheets, budgets, etc → optimal when tasks independent, certain, simple

- market ~ relies on pricing, fees, bonuses → optimal when internal parties can be identified
- clan ~ relies on trust and common values → optimal when firm or divisions are small
- promoting innovation – market v. hierarchy + capitalism v. socialism + transaction v. coord costs + haggling v. shirking (free ridership)
- importance of knowledge utilization – identify knowledge + transform tacit into explicit knowledge + co-location of knowledge and rights

8. November 17 – Organization Design: Fit or Misfit - Ely Lilly (Case) and Organization Design (Article)

- key paradigm shifts – chemical to biological + doctors move from customers to bystanders (replaced by insurers) + integration of IT into drug discovery process
- pharma strategies ~ driven by R&D (Merck – beta blockers) and marketing (Pfizer – Viagra) + jt ventures allow tapping into new innovations + develop / leverage market competencies in specific therapeutic areas
- Lilly's strategies –
 - corporate – keep pipeline full as patents expire by leveraging R&D, FDA competencies in specific therapeutic areas (Psychopharmacology and Endocrinology)
 - insulin strategy – S-curve → cleaner insulin (Humlin) = more pricey
 - organizational -
- organizational design –
 - available structures – impacts firm's ability to get customer information + identify / lock into new design

	Pros	Cons
▪ <u>functional</u>	▪ ease of supervisions + maximum specialization	▪ conflict prone + free ridership + difficult to define performance responsibility + does not produce general manager
▪ <u>divisional</u>	▪ simplifies coordination + better client responsiveness + better performance accountability + do-ers decide	▪ duplication of effort + creates superficial skills + competition b/w business units
▪ <u>matrix</u>	▪ best of both worlds – control + knowledge sharing	
▪ <u>process based organizations</u>	▪ focus on core process strengths (entrepreneurial / competence building / renewal)	
▪ <u>project based organizations</u>	▪ leverage core skill strengths w/i discrete projects	
▪ <u>internal hybrids</u>	▪ see class 7 above ▪ <u>includes</u> - skunkworks + spaghetti org + incubators	
▪ <u>external hybrids</u>	▪ see class 7 above ▪ <u>includes</u> – equity JV + outsourcing + strategic alliances + sub-K	

- internal linking – where is a product located within an organization (products take on the organizational environment in which they are placed)
- external linking – do links provide access to “customers-that-matter”
- locking in a new Dominant Design –
 - internally – establish tools for inter-departmental coordination
 - externally – enable customer intelligence + detect wrong customers + ensure talking to “right” customers
- Prof takeaways –
 - insulin is in wrong location
 - market driven strategy precludes access to customers that matter (limiting ability to see their needs)
 - patients go through learning process (~ to adopt new technology) only when benes are large

9. November 19 – Emergent Organization Design to Fit Innovation – 3M (Case), Hermes (Case), Capturing Value from Technological Innovation (Article)

- **innovation** – **new ideas** (autonomous v. induced) + **implementation** resulting in improvement / gain / π (driven by structure + scorecards + incentives + culture + people)
 - **types of innovation** – new business / industry OR change basis of competition OR line extension
 - **considerations** – solution may come before need arises +
 - **openings to innovate** – incremental bridge beyond existing tech + intuitive leap from existing tech (applied in new ways) + stimulation from outside source + reversal of prior assumptions (new understanding of situation) + combo of technologies
 - **key** ~ balance b/w innovation and implementation (beware disconnect b/w R&D and marketing)
 - **inventpreneur** ~ invents and implements
 - **managing innovation** –
 - **principles** - goldilocks principle (balance) + structured serendipity + stretch goals (keep people moving + recognize that innovation is time sensitive) + trial by fire + benevolent blind eye + publicize hero's journey
 - **steps** – create innovative self image + foresight of where customers going + set stretch goal of redefining industry + supply necessary resources to EEs (empowerment) + facilitate communication + reward / recognize
- **ambidexterity** – Janusian (ability to see in multiple directions at same time) +
- **entrepreneurial subsidiary** (Hermes) – proprietary / revenue rights to new product + stock incentive kicker to entrepreneurs if milestones reached (minimize Parent investment / maximize entrepreneur incentive to perform w/o Parent support) + sub has right to buyout parent after set time / goals met + parent has right to merge w/ sub (providing large financial incentives to entrepreneurs) + entice best EEs from other orgs to join parent (w/ goal of setting up sub) + no obligation to rehire EEs moving to sub (or EEs to rejoin if sub merged)
- **e.g.**, - 3M, Hermes
- **prof takeaways** – internal venture challenge ~ spillover to rest of firm + post IV integration + maintain org integrity + liquidation of dogs

10. November 24 – External Hybrids – When is Virtual Virtuous (Article), VCR (Article), MCC Smart Car (Case)

- **virtual org** – sub-K as much as possible
 - **benes** – better market based incentives + more adaptability + faster development of technology by using broader range of resources + broader based buy in to a particular standard if momentum c/b initiated + minimize curse of asset legacy
 - **cons** – lower coordination inhibits initiatives + competition can hurt p'ships at some point in future + no conflict resolution mechanism + less adept at establishing standards + less adept at protecting / using **tacit knowledge** and IP + less ability to influence standards + less ability to pace technology (bring to market at desirable time) + less ability to advance related technologies + hold-up risks + less able to compete if overly dependent on others + multiple partners less able to align strategically + loss of brand equity
 - **tacit knowledge** – implicitly grasped but not fully articulated → spreads slowly + more easily protect w/i an org
 - **key strategies** – keep core competencies in-house (and invest therein) + leverage relationships where have greater influence (large customer vis-à-vis small supplier, ala Toyota)
 - **MCC Smart Car** – Swatch group lost control / final product differs from original product design
- **innovation types** -
 - **autonomous** – pursued independent of other innovation
 - **systemic** – depends on complementary innovations → generally easier w/i a company
- **modularization** (as opposed to integration) – strategy that levers modular product architecture
 - modularity in use – computers (compatibility, upgradability)
 - modularity in production – cars (reduce assembly costs)
 - **cons** – lose control of IP

- prof takeaways –
 - systemic innovation – many benes but issues re architectural ownership
 - structural innovation (~ virtual org) – Greenfield v. Brownfield (curse of asset legacy)
 - dominant architectures → built by establishing critical mass of customers until reach some tipping point that causes lock-out / lock-in to occur
 - standard ~ defined to entire value chain (not just to a firm)
 - **consider competition b/w value chains (not just b/w firms)**

11. November 26 – Producing the Tipping Point (or not entrepreneurial networking) – The Tipping Point (Article), Networking (Article), and Jerry Sanders (Case)

- **tipping point** – moment of critical mass / threshold / boiling point / point at which something tips out of equilibrium
 - **Law of the Few** – 80/20 rule + most things spread through few special actors
 - **Stickiness Factor** – once touched → changed forever + different ways of making something memorable / sticky
 - **Power of Context** – power of situation
 - **Big impacts** – little thing c/b what triggers a tip past the tipping point + little changes can have big impacts
 - **actors** – connector + maven (pool of knowledge) + salesperson
- networking – when who you know takes precedence over what you know
 - **networking effects** – **direct** (benefit is greater w/ more users) + **indirect** (benefit from complements)
 - **tipping point** → can yield winner take all situation especially w/o interoperability (AOL in instant messaging)
 - **relevance** – access to know-how / contacts / resources / serendipity + unique combos yield opportunity + network idea operate w/i & across orgs + facilitates finding discontinuities / emerging markets / new designs
 - **knowledge circulation** – internal (job rotation / cross boundary roles / IT / social networks) + external (strategic alliances / JVs / licensing / MI / p'ships / consortia)
 - **other considerations** – structural holes + network surrounding a person + network comprising linked entities / individuals + tipping points + influence
- incompatible entries –
 - **why** – timing of innovative introduction + strategic action + network topology
 - **strategies** – depends on network structure
 - **few / no shortcuts** – firm w/ large resources can win w/ incompatible paradigm
 - **substantial shortcuts** – better to compete w/i existing standard ?
- consider –
 - structure of customer interaction (~ complete / sparse networks) affects how innovation spreads – consider shortcuts / size / randomness
- Profs takeaways –
 - dominant design involves components & architecture
 - entrepreneurs more nimble than est. firms
 - structural holes allow creation of new dominant designs / S-curves

IV	Key Themes
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- with hammer → everything looks like a nail
- myopia