



***Pozitia si Rolul Inginerilor
in Mediul Profesional
si in Societatea Canadiana
~ O Perspectiva Manageriala ~***

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Agenda

- Pozitia inginerilor in societate
- Pozitia inginerilor in cadrul firmei
- Perceptia rolului inginerului - interactia cu alte profesii
- Contributia inginerilor in procesul de optimizare a functionarii firmei
- Sugestii pentru succesul profesional

Engineers in Society

Professions

- Professions have been created and developed as a response to a societal need
- Professional characteristics:
 - Practiced by a representative number of people (min 5,000)
 - Expert knowledge and qualifications derived from academic learning (degree) – as opposed to skills and abilities derived from experiential learning
 - High quality standards – regulated by a charter
 - High ethical standards – regulated by a code of conduct

Professional Occupations

- British Royal Charter 1980 – 6 fundamental professions:

- Architects
- Engineers
- Educators
- Accountants
- Physicians
- Lawyers

Engineering = The application of scientific principles to such practical ends as the design, construction and operation of efficient and economical structures, equipment, and systems

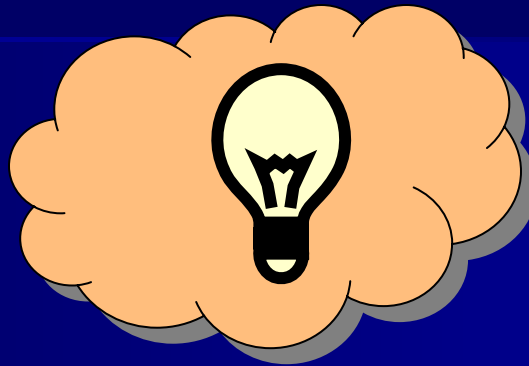
(also: Skillful management or maneuvering)

- Their mission →

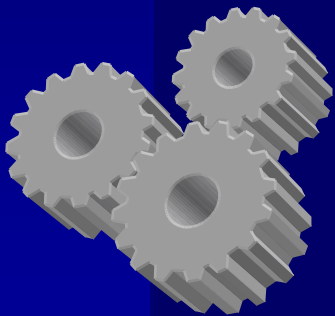
“To IMPROVE the **GENERAL QUALITY** of LIFE”

Did you know? - (Sony presentation)

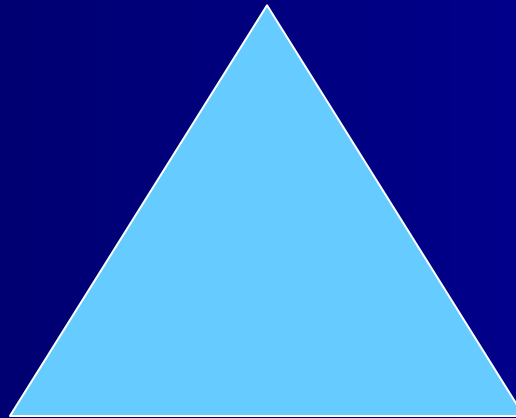
Quality = Perceived benefit



Psychological



Functional

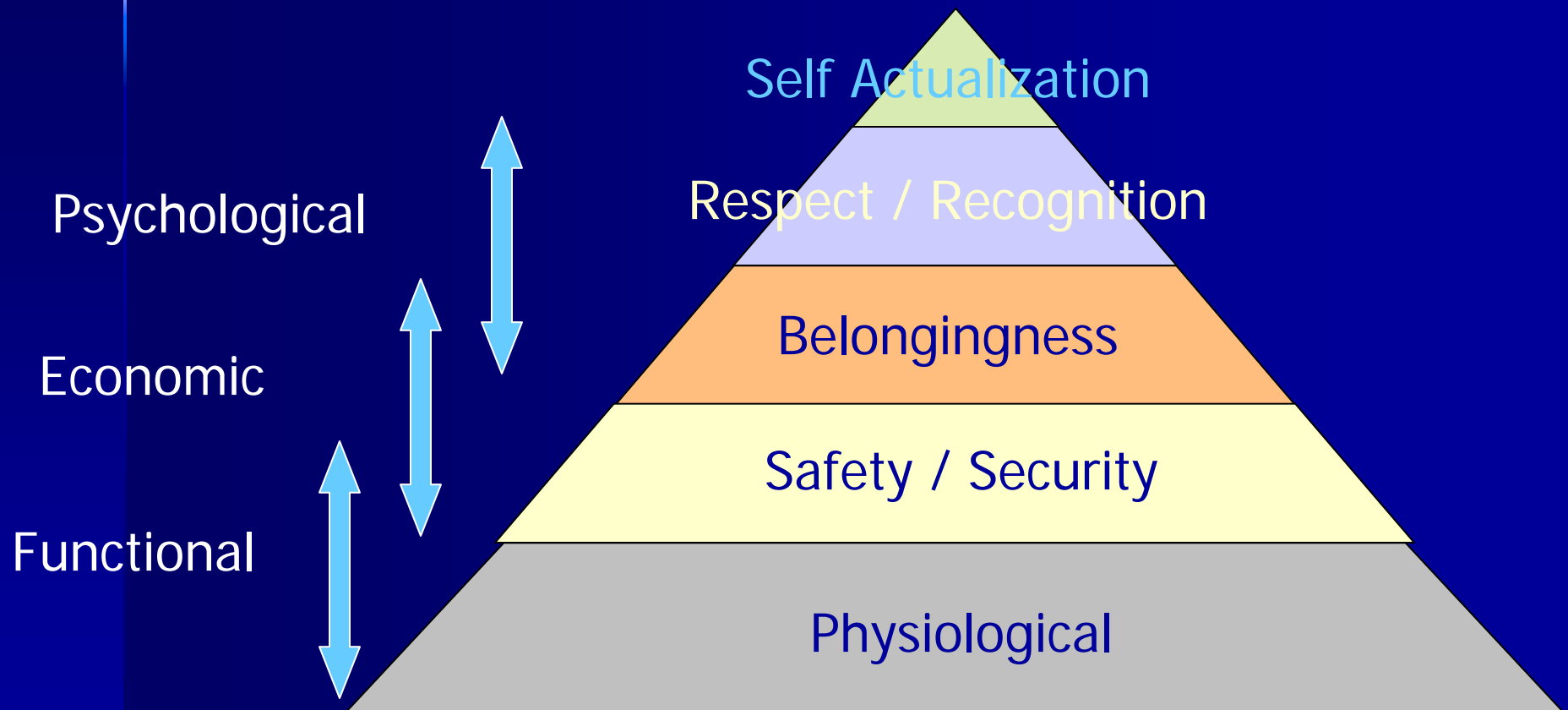


Economic



Benefits are tri-dimensional

Maslow's hierarchy of needs



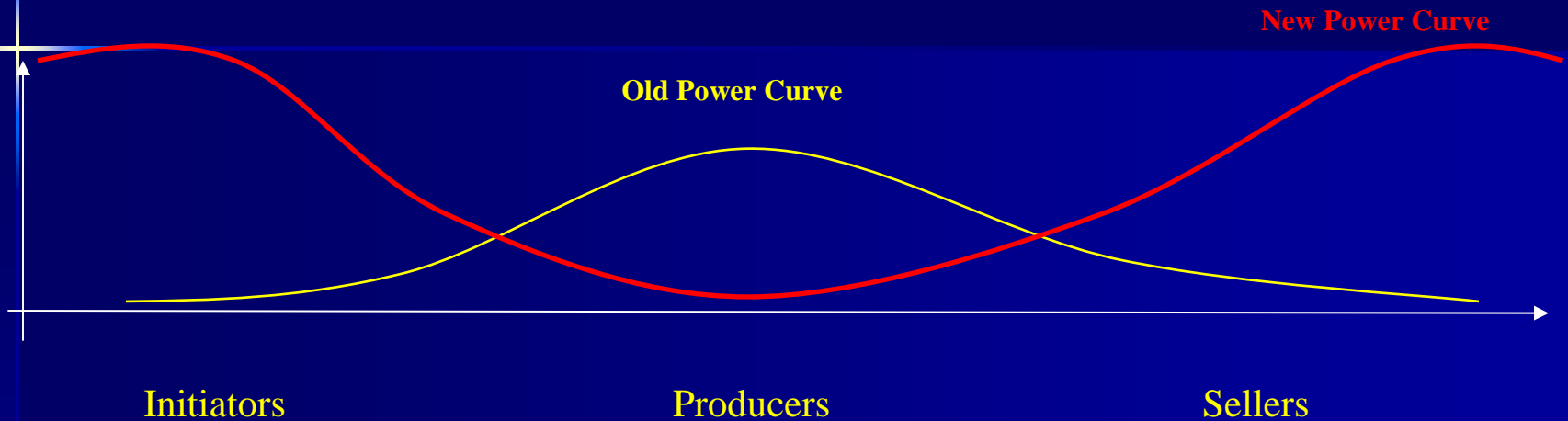
North American Hierarchy

Profession	Functional 1	Psychological 3	Economic 2	Score
Engineer	H 3	L 1	M 2	10
Architect	H 3	M 2	L 1	11
Accountant	M 2	L 1	H 3	11
Educator	L 1	M 2	H 3	13
Doctor	M 2	H 3	L 1	13
Lawyer	L 1	H 3	M 2	14

Professions in Competition

- In free-market-societies the recognition of professional value is conditioned by two factors:
 - The law of supply and demand
 - The willingness of the consumer to pay for the perceived benefits
- In the attempt to elevate the status of the profession and the perceived value of their members, professional organizations apply the following strategies:
 - Keeping the supply low – by raising entry barriers to newcomers into the profession (all)
 - Lobbying the governments to subsidize the services they provide (Doctors, Educators) or to regulate the industry
 - Creating demand by actively manipulating the public perception through advertizing, or exacerbating sentiments to increase the propensity to spend (Doctors, Lawyers)

Perceived Value Creation



The new paradigm:

It's the original idea and the storytelling that's building the business.

Due to the cheaper outsourcing the making is no longer considered hard, or special, or differentiating.

The new success strategy:

1. Invent stuff worth talking about
2. Tell a good story about what you've invented

Engineers inside the Firm

Engineering Specialties

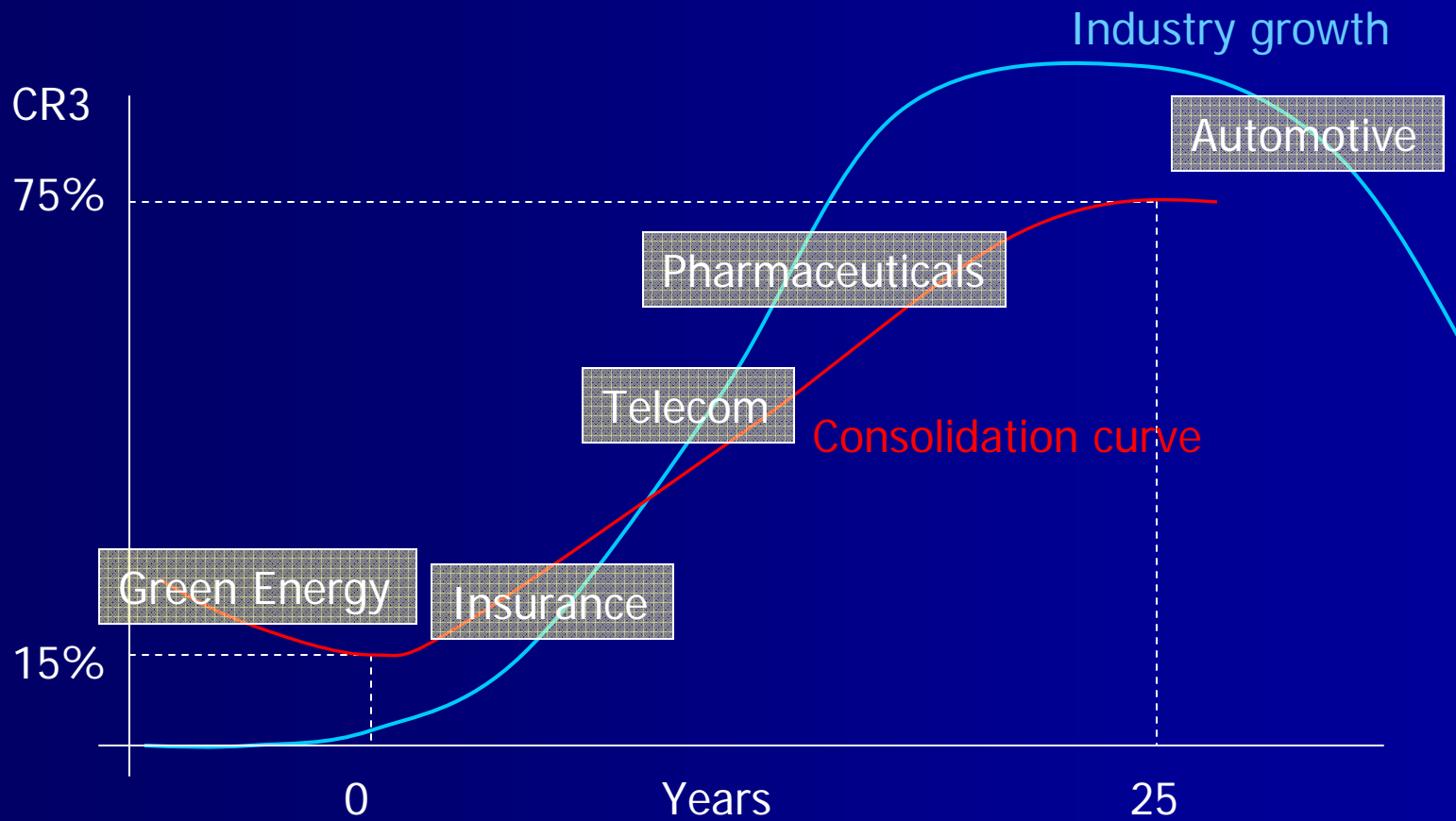
- Design Engineer
- Process Engineer
- Manufacturing Engineer
- System Engineer
- Civil Engineer
- Structural Engineer
- Electrical Engineer
- Electronics Engineer
- Mechanical Engineer
- Turbine Engineer
- Telecommunication Eng.
- Financial Eng.
- Biochemical Eng.
- Locomotive Eng.
- Board Eng.
- Naval Eng.
- Bridge Eng.
- Building Eng.
- Maintenance Eng.
- Genetics Engineer
- Computer Engineer
- Software Engineer
- Hardware Engineer
- Automotive Engineer
- Test Engineer
- Safety Engineer
- Environmental Engineer
- Quality Engineer
- Sustainability Engineer
- Aerospace Eng.
- Laser Eng.
- Weld Eng.
- Paint Eng.
- Mining Eng.
- Metallurgical Eng.
- Agricultural Eng.
- Hydro Eng.
- Transmission Eng.
- Architectural Engineer
- Logistics Engineer
- Robotics Engineer
- Medical Equipment Engineer
- Industrial Engineer
- Thermal Engineer
- Optics Engineer
- Acoustics Engineer
- Sound Engineer
- Nuclear Engineer
- Research Engineer
- Sales Engineer
- Product Engineer
- Project Engineer
- Lean Engineer
- Tooling Engineer
- Roof Engineer
- Dam Engineer
- Traffic Engineer

Professional Environment

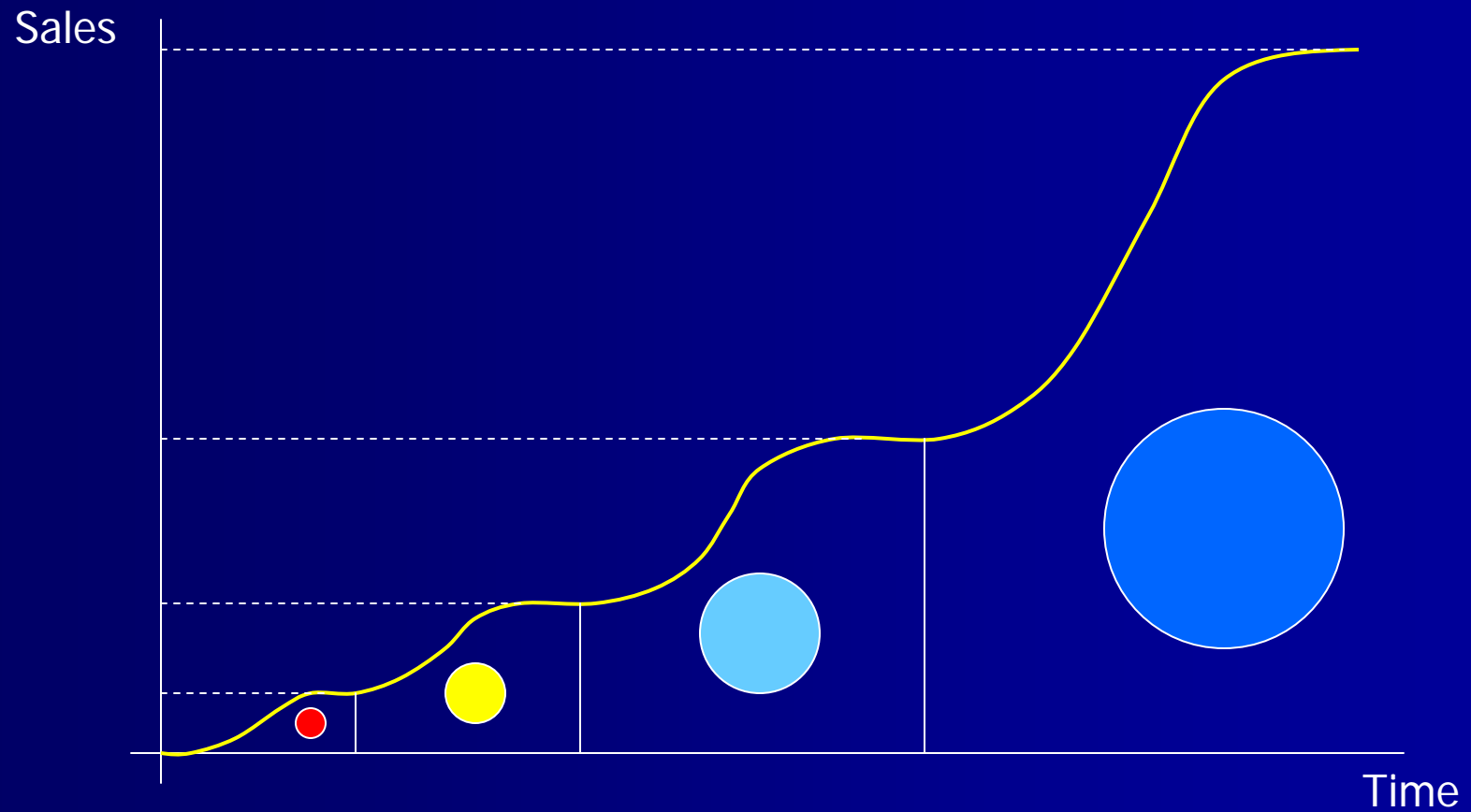
- Professionals work in larger or smaller organizations
 - The higher the score → the more individualistic the profession
 - Typically engineers work in teams → larger firms
- Due to the interaction of multiple forces (mostly human) organizations are mainly subjected to two competing desiderates:
 - *Dynamism - the chaos theory*
 - *A certain amount of uncertainty and disorder is beneficial as it forces the organization to continuously innovate and adjust in order to find the new equilibrium*
 - *Stability – organizational entropy*
 - *In any closed system the outputs will decline when the inputs (creativity, modernism, market focus) have remained the same*
 - *Application erosion*

Macro-level – Industry Growth

(North America)



Micro-level – Company Growth



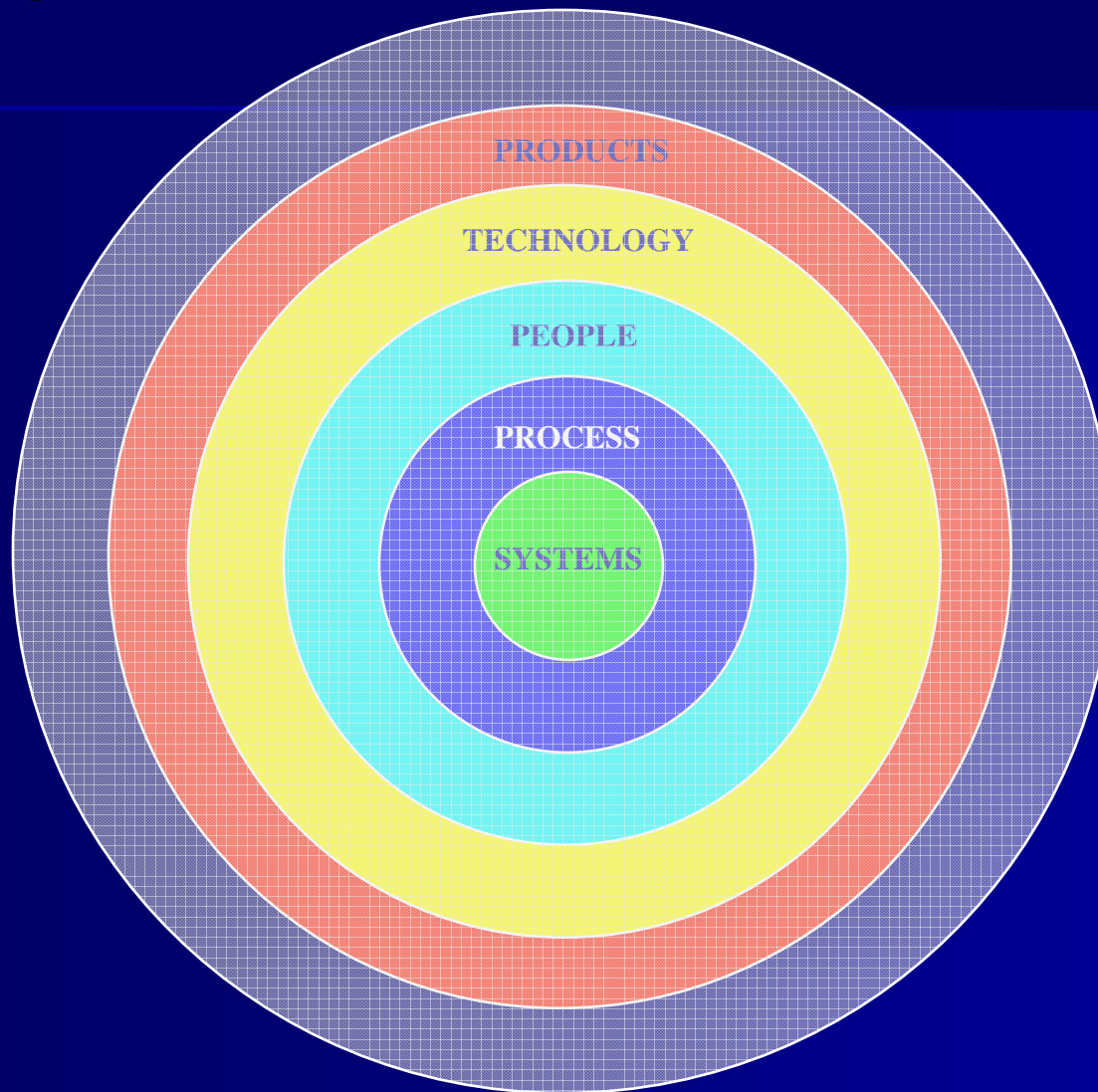
The Business Theory

“Any organization that doubles or triples in size within a fairly short period of time has necessarily outgrown its theory.

The two most clear signals are:
unexpected success and unexpected failure”

Peter Drucker

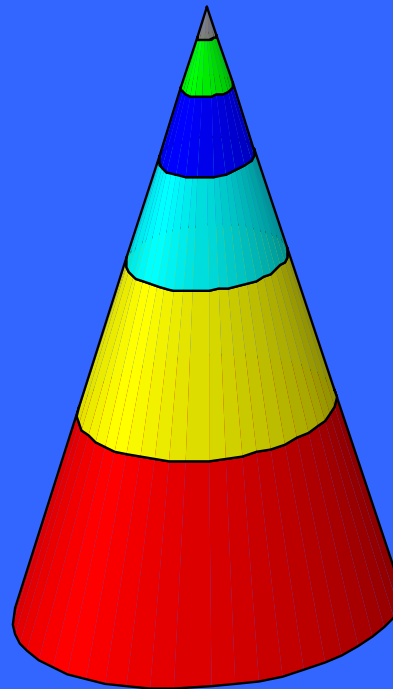
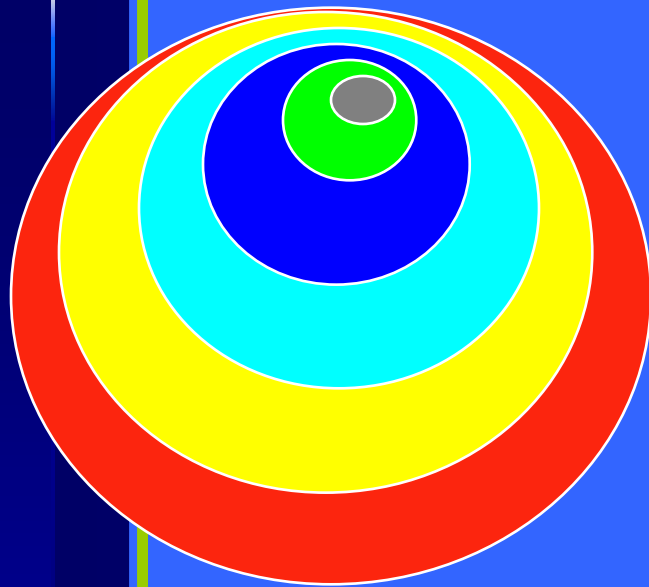
Organizational Growth



Core attribute:

Ability
to create
Synergy

Corporate Hierarchy



- Integration
- Systems
- Process
- People
- Equipment
- Products

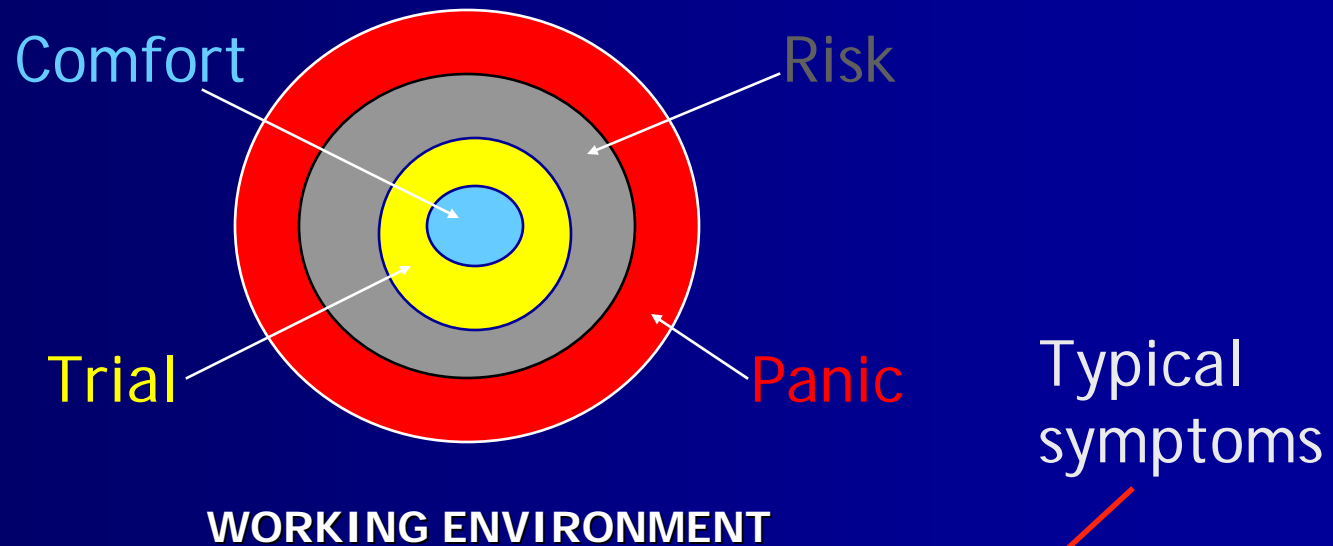
Corporate Environment

<u>Sales/mth</u>	<u>Employees</u>	<u>Org Type</u>	<u>Focus</u>	<u>Interaction</u>	<u>Mngt Style</u>	<u>Control</u>
X 1	0 – 20	Entrepreneurial	Product	Physical	Independent	Visual
X 2	20 – 50	Departmental	Technology	Technical	Consultative	Rules
X 4	50 – 100	Pyramidal	People	Emotional	Collective	Policies
X 8	100 – 200	Functional	Process	Logical	Interdependent	Procedures
X 16	200 – 400	Matrix	Systems	Co-relational	Cooperative	Principles
X 32	400 – 800	Intra-preneurial	Integration	Intuitive	Collaborative	Philosophy

Corporate Growing Philosophy

- The growth is good only if it is sustainable
↓
- Sustainability is ensured by supporting culture
↓
- To be supportive people need to be comfortable
↓
- Comfort is conferred by the clarity of the mission

Comfort Zone Theory



Level	Mission	Subordinates	Peers	Communication
Comfort	Clear	Enthusiasm	Support	Intense - Direct - Informal
Trial	Ambiguous	Hope	Assist	Superficial - E-mail, phone messages - Formal, Rigid
Risk	Uncertain	Resistance	Avoid	Selective - 3-rd parties - CC Superiors
Panic	Unknown	Fear	Abandon	Absent - Deny involvement

Change Theory

Vision + Skills + Incentive + Resources + Plan = Change

XXX + Skills + Incentive + Resources + Plan = Confusion

Vision + XXX + Incentive + Resources + Plan = Anxiety

Vision + Skills + XXX + Resources + Plan = Gradual Change

Vision + Skills + Incentive + XXX + Plan = Frustration

Vision + Skills + Incentive + Resources + XXX = False Start

Positional Optimality

Six Degrees of Separation

- The first study of a planetary-scale social network has been conducted in June 2006 by researchers at Microsoft. They analyzed records of 30 billion electronic conversations (equivalent to roughly half the world's instant-messaging traffic at that time) among 180 million people in various countries.
- Two people were considered to be acquaintances if they had sent one another a message. The objective was to find the minimum chain lengths it would take to connect different pairs of users in the database.
- They found that the average length was 6.6 hops, and that 78 per cent of the pairs could be connected in seven steps or fewer.

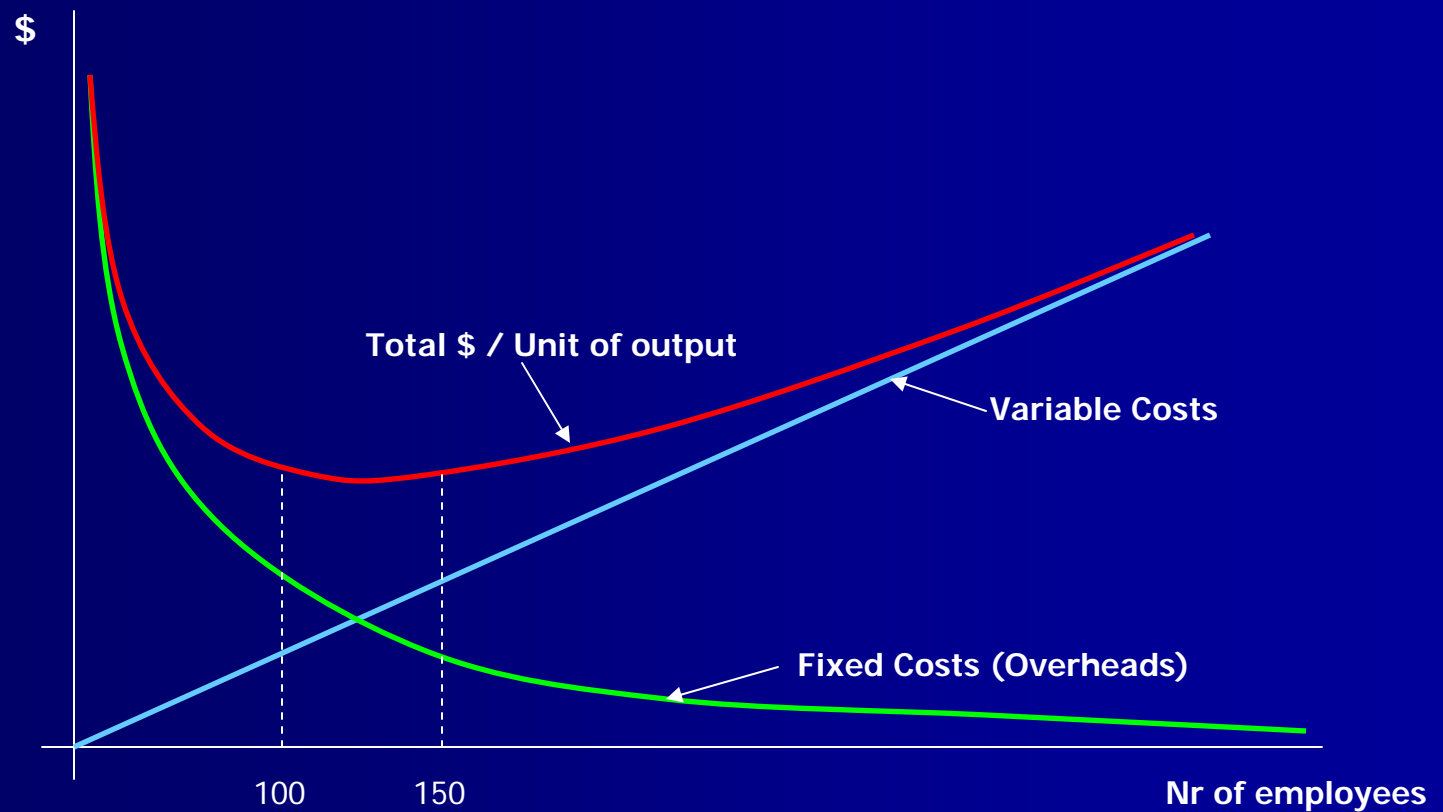
Firm's Optimal Size

High Limit: The lesson for the organizations is that when the employee population exceeds 2^7 it will necessarily contain elements of overlapping and redundancy.

Low Limit: Principle of Requisite Variety – for a system to become sustainable (self sufficient and stable) it requires a certain level of diversity and complexity

Firm's Optimal Size

Correlation with the impact of indirect costs / unit of output



Professional Success Recipe

Meritocracy Principle: $C = K \times E^2$

Contribution Value = Knowledge x Experience x Effort

- Each factor is 3-dimensional
 - Knowledge: Spread x Depth x Time
 - Experience: Variety x Relevance x Time
 - Effort: Intensity x Extent x Time

Companies are not perfect meritocracies!

Contributions are considered valuable only as long as the **Attitude** of the provider is compatible with the Organizational Culture.

Contribution Areas

- **Creativity** – solutions rather than random ideas
- **Increase the firm value**
 - Reputation – visibility, notoriety, prestige
 - Intellectual prowess – competence, expertise, proficiency
 - Innovation capability – creativity, uniqueness, differentiation
- **Create more revenue**
 - Detect new business opportunities
 - Interact with clients – expand the offering
- **Spot cost saving opportunities**
 - Reduce quality cost
 - Improve efficiencies, productivity
- **Reduce overheads**
 - Create / adopt intelligent systems
 - Simplify processes

Attitudinal Principles

- Nobody cares how much you know until they know how much you care.
- Mistakes are tolerable. Their repetition is not.
- The good of the team is more important than the good of an individual.
- Give first if you want something in return. Respect if you want to be respected.
- Strive for more if you want to do enough.

*** Attitudes are generally shaped by environment (culture), generational traits and personality ***

Generational Characteristics

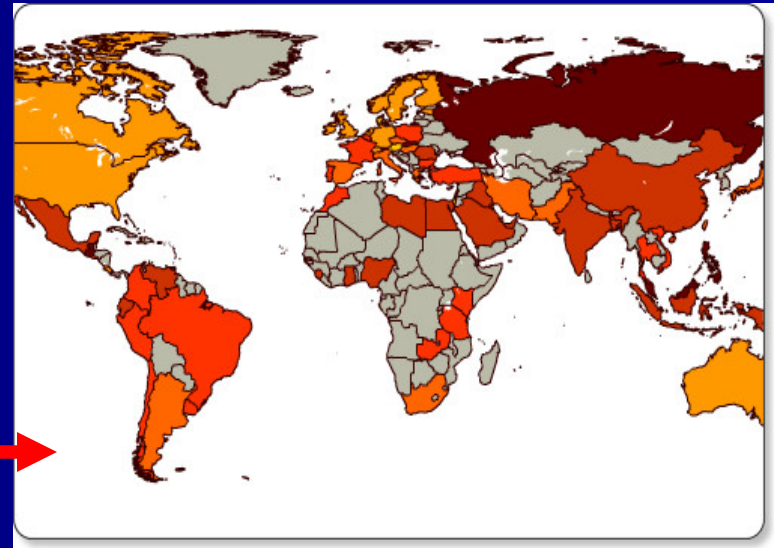
- Traditionalists – (Born 1922 - 1945) –
“Pay your dues” and “Honest day’s work for an honest day’s pay”
- Baby Boomers – (Born 1946 - 1964) –
“Live to work”
- Generation X – (Born 1965 – 1980) –
“Work to live” – Balance
- Generation Y – (Born 1981 – 2000) –
“Work to contribute”

Professional Success - Ingredients

Personality	Introvert / Think	Introvert / Feel	Extravert / Feel	Extravert / Think
<i>Appearance</i>	Conservative	Casual	Fashionable	Functional
<i>Style</i>	Systematic	Easy going	Spontaneous	Decisive
<i>Focus</i>	Process	Relationship	Interaction	Results
<i>Likes</i>	Accuracy	Attention	Recognition	Productivity
<i>Work preference</i>	Structured	Friendly	Stimulating	Efficient
<i>Fears / Avoids</i>	Embarrassment	Confrontation	Loss of prestige	Loss of control
<i>Wants to be</i>	Correct	Liked	Admired	In control
<i>Motivated by</i>	Credibility	Agreement	Status	Success
<i>Irritated by</i>	Uncertainty	Impatience	Routine	Indecision
<i>Value</i>	Logical analysis	Personal feelings	Fun impressions	End result
<i>Concerned with</i>	How it works	Effects on others	Benefits	Cost
<i>Likes you to be</i>	Precise	Pleasant	Outgoing	Brief

Powers within the firm

- Expertise
 - Credentials, Seniority, Knowledge
- Referent
 - Trust, Respect, Personality
- Legitimacy
 - Position, Authority
 - Power distance in different cultures
- Reward / Coercion
 - Give or take away what is valuable to others
- Association
 - Networking, Connections, Access to information



Professional Success Recipe

- Find the right industry / company
 - Develop skills that are in synch with the economic development of the social environment
 - Understand the stage of the industry, cyclical development of the firm
 - Company's Size and Reputation matter
 - Be aware of the organizational culture

- Position yourself favourably
 - Be adaptable – move on when stagnation becomes a threat
 - It is not the strongest species that is best equipped to survive a climate change, but the most adaptable one (C. Darwin)
 - The successful people in the future will be the ones that are special, specialized or adaptable (T. Friedman – The World is Flat)
 - Stick to the core (identify how the organization creates value and how one could contribute to it) – core is any activity in the path of promotion to the top

- Increase your value through positive contribution and attitude
 - Meritocracy principle
 - Attitudinal architecture
 - Power of influence
 - Generational divide
 - * Cultural differences – power distance
 - * Personality traits

Appendices

Power Distance Characteristics

- **In high power distance cultures the following may be observed:**
 - . Those in authority openly demonstrate their rank.
 - . Subordinates are not given important work and expect clear guidance from above.
 - . Subordinates are expected to take the blame for things going wrong.
 - . The relationship between boss and subordinate is rarely close/personal.
 - . Politics is prone to totalitarianism.
 - . Class divisions within society are accepted.

- **In a low power distance culture:**
 - . Superiors treat subordinates with respect and do not pull rank.
 - . Subordinates are entrusted with important assignments.
 - . Blame is either shared or very often accepted by the superior due to it being their responsibility to manage.
 - . Managers may often socialize with subordinates.
 - . Liberal democracies are the norm.
 - . Societies lean more towards egalitarianism.

Power Distance - Solutions

- **If you are working with or going to a country with a **higher** PDI than yours then:**
 - give clear and explicit directions to those working with you. Deadlines should be highlighted and stressed.
 - do not expect subordinates to take initiative.
 - be more authoritarian in your management style. Relationships with staff may be more distant than you are used to.
 - show respect and deference to those higher up the ladder. This is usually reflected through language, behaviour and protocol.
 - expect to encounter more bureaucracy in organizations and government agencies.
- **If you are working with or going to a country with a **lower** PDI than yours then:**
 - don't expect to be treated with the usual respect or deference you may be used to.
 - people will want to get to know you in an informal manner with little protocol or etiquette.
 - be more inclusive in your management or leadership style as being directive will be poorly interpreted.
 - involve others in decision making.
 - do not base judgments of people on appearance, demeanor, privileges or status symbols.

Generational Characteristics

Traditionalists – (Born 1922 - 1945) – “Pay your dues” and “Honest day’s work for an honest day’s pay”

- Loyal to the Organization
- Respect for authority and hierarchical systems
- Career = opportunity
- Formal relationships with superiors
- When in conflict defer to seniority
- Work hard – get it done
- Don’t rock the boat – follow the leader
- Dislike change
- Command and control- rigid and dictatorial
- Dispense information on a need-to-know basis.
- Micromanagement

Generational Characteristics

Baby Boomers – (Born 1946 - 1964) – “Live to work”

- Loyal to the Team
- Challenge authority
- Career = self worth
- Personal relationships with superiors
- Avoid conflict
- Bend the rules to suit the circumstances
- Work in teams, focused on people
- Cautious of change
- Participative Management style
- Decisions by consensus
- Flat and democratic organizations
- Dispense information on a need-to-know basis.

Generational Characteristics

Generation X – (Born 1965 – 1980) – “Work to live” - Balance

- Loyal to the Manager
- Competence and skills are respected over seniority
- Career = one part of me
- “Tell me what you can do for me”
- Informal relationships with superiors
- Open dialogue to resolve conflict
- Flexible work style - multitasking
- Focus on results
- At ease with change
- Fair and straightforward
- Brutally honest

Generational Characteristics

Generation Y – (Born 1981 – 2000) – “Work to contribute”

- Loyal to colleagues
- Respect for demonstrated competence and advanced skills
- Career = opportunity to add value
- “Show me what you can do for me right now”
- Casual relationships with superiors
- Debate and striving to achieve compromise
- Focus on quickest solution – reliance on technology
- Challenge the rules
- Desire change, open minded
- Opinionated but inclusive
- Tolerant and independent