

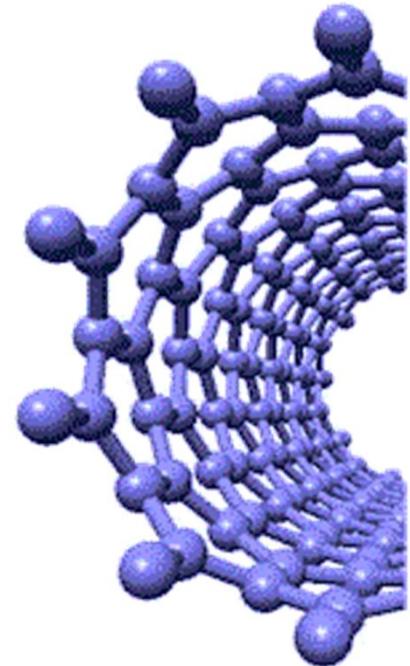


INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

# Inovace a rozvoj studia nanomateriálů na TUL

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Tyto materiály byly vytvořeny v rámci projektu  
ESF OP VK: **Inovace a rozvoj studia nanomateriálů  
na Technické univerzitě v Liberci**



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Ing. Stanislav Petřík, CSc.,

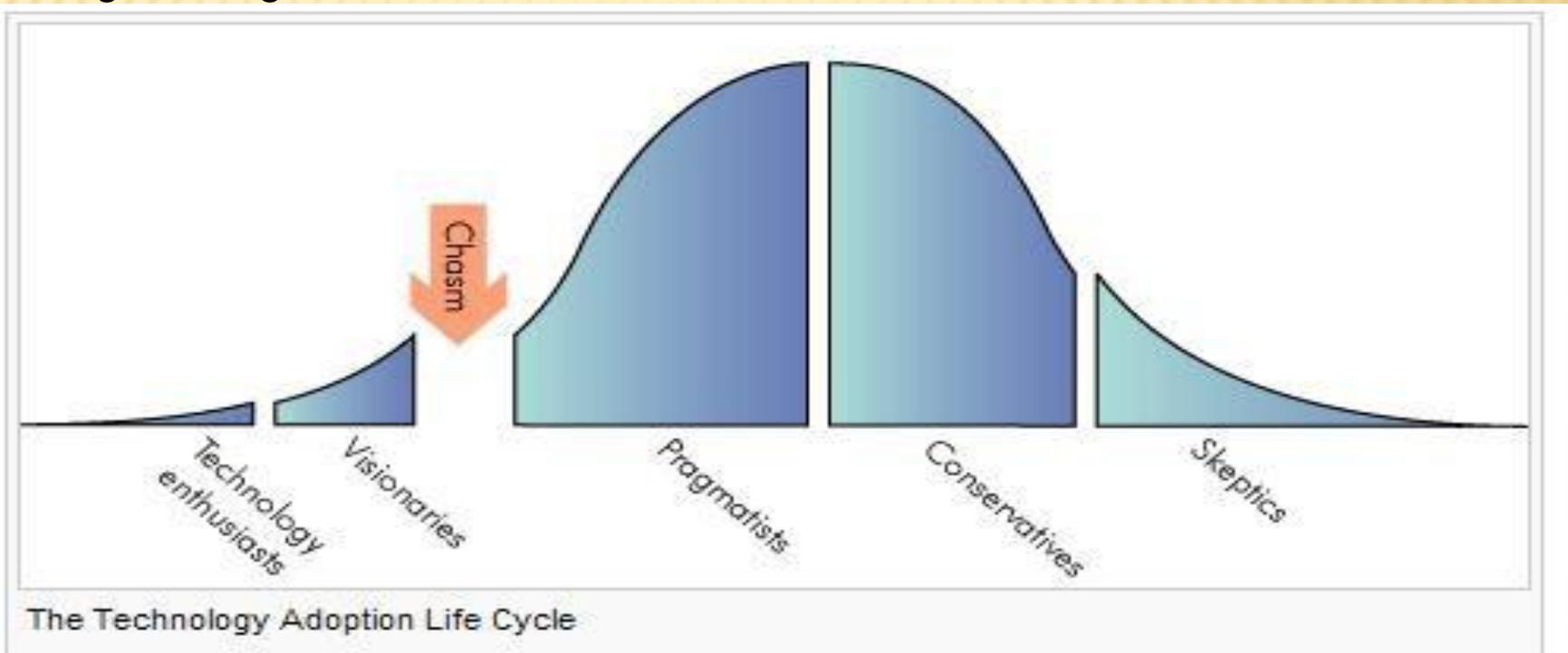
Ing. Aleš Gardián, MBA (Elmarco s.r.o.), Fred Lybrand; MBA (Elmarco Inc., USA)

# **INOVACE A PODNIKÁNÍ** **V OBLASTI NOVÝCH TECHNOLOGIÍ**

# “Crossing the Chasm” by Geoffrey Moore - Review

**Chasm** = the gap which the start-up company has to cross to get to the mainstream markets

**Beachhead** = “point of attack”, a military expression, means in this context the area (eg. niche market segment) where the start-up company has to attack first and gain a significant marketshare



# “Crossing the Chasm” - Review

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## ***Innovators (Technology enthusiasts):***

New technology is of their central interest, but there usually are not many of them

## ***Early adopters (Visionaries)***

Buy very early in the product life cycle

Not technologists but understand the benefits of a new technology

Do not rely on well-established references

Are not so price-sensitive, they see a vast potential for the new technology

Are easy to sell but hard to please - they are buying a dream

They want customization, are project oriented

They are in a hurry, they see now a window of opportunity

# “Crossing the Chasm” - Review

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## ***Early majority (pragmatists)***

Driven by a strong sense of practicality

Know that many innovations fail

Wait to see whether other buyers succeed

Like to see competition - to have more than one alternative

Want to be sure that they are buying from a proven market leader

Reasonably price-sensitive - willing to pay a modest premium for top quality or special services

## ***Late majority (conservatives)***

Wait until something new has become an established standard

Want to be sure that they can handle the new technology and that they get all the support

They buy from well-established companies

# “Crossing the Chasm” - Review

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## Early market

Innovative product = something without known market value or purpose but with “great properties”

Generates a lot of enthusiasm

## Mainstream market

The rest of the world watches to see if anything can be made of this

If a value proposition is discovered that can be predictably delivered at a reasonable price, then a new mainstream market forms

**Crossing the Chasm** = making the transition from an early market, dominated by a few visionary customers, to a mainstream market dominated by a large block of customers who are predominantly pragmatists in orientation

Transition from visionaries to pragmatists customer is extremely difficult.

**Many organizations unable to gain mainstream acceptance**

# “Crossing the Chasm” - Review

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## **Catch 22 principle**

Early adopters are not good references to Early majority

The only suitable reference for an Early majority customer are other recognized members of Early majority

**Pragmatists won't buy from you until you are established, yet you can't get established until they buy from you;**

But: once a start-up is successful with pragmatist buyers, they tend to be very loyal and help it succeed - then the cost of sales goes down

## **Early successes**

What the company and investors mostly interpret as a ramp in sales leading smoothly up the curve, is in fact an initial blip (the early market, innovators and early adopters buying), and not the first indications of an emerging mainstream market

# “Crossing the Chasm” - Review

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## Early market - dangers

- The company might neglects to change the sales strategy (after some success in early markets with visionaries)
- The pragmatist really wants to hear about are up-and-running production installation
- No safety through continuing to service just the early market
- Sales opportunities = other visionaries who can be sold to
- But each one is going to have a unique dream, leading to unique demands for customisation
- Sooner or later in this early market, yet another entrepreneur with a yet more innovative technology

At that time, need to finish crossing the chasm and establishing the company in the mainstream market

Go enter the mainstream market = act of aggression, no one wants your presence, you are an invader

# “Crossing the Chasm” - Review

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## **Limitations**

Start-ups operate with scarce resources

To confine to target market segments requires discipline - this is what high-tech management shows itself most lacking

Companies must stop pursuing any sale at any time for any reason

Need for change from a sales-driven to a market driven company

## **Necessary company goal**

Secure a beachhead in a mainstream market

Must be made strategically, this can only happen if the sales effort is focused on one or two niche markets not to burn resources

Pragmatist customer want to buy from market leaders

A company can get market leadership only in one or two narrowly bounded market segments

Total commitment to the niche necessary, then do the best to meet everyone else's needs with whatever resources you have left over

# “Crossing the Chasm” - Review

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## **Problem = make a high-risk, low data decision**

Make the most important decision with little or no useful information;  
But no one has any experience with which to predict what will happen  
The biggest mistake one can make  
Turn to numeric information as a source of reassurance  
There are no market-size forecasts , no press releases

## **The only response**

Acknowledge the lack of data as a condition of the process;  
Rely on *informed intuition*, rather than *analytical reason*  
Conclusions based on a few high-quality thoughts (data fragments)  
that it takes to be archetypes of a broader and more complex reality

## **Such nasty decisions must be made quickly**

**Important to go hard in the direction chosen, regardless of doubts**

# “Crossing the Chasm” - Review

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## **Positive side of this issue**

Not necessary to pick the optimal beachhead to be successful  
But necessary to win the beachhead you picked  
Force the pace at all times, even when in doubt,

## **Target market segments**

People normally think that bigger is better  
Opposite is the truth  
Company must dominate the market to be recognized  
Need to win at least half of the market

## **Recommendation**

If you find the target segment is too big, subsegment it

# Elmarco History Before Discovering The Chasm

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## 2004-2007

- Focus on unlimited number of application areas
- Rather academic research based on the literature search and academic conferences
  - Predicting big opportunities based on „nano-samples“
  - Topics changing quickly
  - Related to public funded money and preferred topics
- Development of versatile technology
- Omitting development of a whole technology
  - Lack of deep technological knowledge
  - Broadening the research in chemistry and polymers
  - Weak customer support (operation, cost, technical limits)
- Quality standards underestimated – not acceptable for pragmatists

# Elmarco History Before Discovering The Chasm

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## 2008-2011

- Focus on almost unlimited number of applications, while surface loading filtration being preferred
- The added value was demonstrated sufficiently
- Very good awareness of Elmarco in this area
  - Good presence at trade shows, conferences etc.
  - Most important installations published
- Elmarco close to having a beachhead area
- Concentration on compact design rather than on the efficiency issues
- Improving development of a whole technology
  - Deeper technological knowledge
  - Narrowing the research in chemistry and polymers
  - Improved customer support (operation, cost, technical limits)

# Business Status 2012

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Elmarco has to enter high volume markets

Polymer systems with novelty properties and high throughput needed

## **Elmarco can sell today basically only to**

- Part of surface air filtration market segment
- Innovator type customers
- Customers supported by public funds/grants

## **Elmarco's development resources are mainly used to**

- Support customer sampling requests
- Customize equipment for customer needs
- Improve reliability, repeatability, stability
- Support public funded projects (important source of revenues)
- Only remaining part of resources (very small) is used for core technology development, and that in a „try and error“ style

# Business Status 2012

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- Current generations technology (1G and 2G) and process & application know-how can utilize only limited markets (segments), mainly in air filtration, and also here mostly only surface filtration
- For many other markets the throughput (= cost model) is the main barrier, right after the technical hurdles are solved
- For utilization of membrane markets (performance apparel, liquid filtration) might requires some breakthrough in the chemistry soon
- Market requirements not yet sufficiently known for many applications
  - Minimum cost per sqm
  - Combination of minimum parameters
  - Acceptable level of defects
  - Supply chain requirements,
  - Required volumes
  - Available benchmark products
- Search for a potential customers working as a development partner, who would co-finance the first end product or machine prototype?
- Inform current customers that we are addressing the throughput issue, to keep them interested?

# What Can Expand Market Size - Examples

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- No solvent required (hot melts)– broader range of popular polymers available including PP, PE, PET, etc.
  - Technology promising as for the new polymers
  - Plenty of chemistry limitations
- Almost no defect in 24/7 production, stability and repeatability of process in various production environments
- Significant increase of productivity particularly for thick membrane applications such as liquid filtration, performance apparel & battery separator
  - 2 times to 5 times expected
  - Can be addressed by small improvements to breakthrough
- Lower priced Lab tool series (from bench top class to Super Lab class) to penetrate research customers, which could create Production Line inquiries within a few years in the region with very high chances.
  - Rather a pricing (margin) decision

# Relevance of the Chasm for Elmarco Business

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**Innovators and Early Adopters:** these are the categories of customers where Elmarco has so far sold equipment to

- Lab sales: Elmarco is (to our knowledge) market leader (= >50% market share), not in the market segment for simple and cheap needle type tools, which are addressing a different niche
- Lab customers are no references for potential line customers (for sure not for pragmatists); as developed applications are not needed for sales of Labs, customers are typically innovators, buying the product to try out new ideas (to do research)
- Line sales - many customers are/were innovators (HemCon, Primecell, Shinwa, Atira) using it erratically and only as an R&D tool, very few of them are real Early Adopters (Mann+Hummel), and some presumably in-between (Clarcor, NTT)
- This means, no pragmatic customer base we can reference to (yet), in order to cross the chasm; Some of them have the potential to become a (referencable) pragmatist customer base, like M+H or H&V

# Relevance of the Chasm for Elmarco Business

- Elmarco has done most of the mistakes in applications, as “tried to cover all, and achieved nothing in the end”
- ELM has identified target segments, but failed to focus resources narrowly to assure success
  - Two examples of this unsuccessful approach, as shown below:
- A list of applications in 2009, very wide, predetermined to fail

Current Application Area-End Product		Mentor	New Application Area-End Product		Mentor
Aligned NF/Composites		Ales Gardian	Face Masks		
Cigarette filters	<b>NEW</b>	Ales Gardian	Drug release		
Photocatalysis		Kaz Nomoto	Cosmetics		
Food packaging		Kaz Nomoto	Fuel Cells		
Filtration (Air+Liquid)		Ken Donahue	Catalysis		
Hygiene		Ken Donahue	Sensors		
Medical	<b>NEW</b>	Ladislav Mares	Porphyrines		
Batteries		Ladislav Mares	Vacuum Cleaner Bags		
Ion exchangers		Ladislav Mares			
Acoustic		Vilem Ruzicka			
Solar		Vilem Ruzicka			

# Relevance of the Chasm for Elmarco Business

- ✗ Segment analysis, as approved beginning of 2011, narrower, but still showing 6 main applications (segments), which is by far too many; Thereupon was based the “Application Experts” concept, which also failed due to the (unmanageable) complexity and width of the tasks and the lack of qualified experts (not really surprising, looking backwards)

	<i>Application Experts (proposal)</i>
<b>1. <u>Established Applications / Products (Sell)</u></b>	
• <b>Lab Products</b>	<b>Stan Petrik **</b>
<b>2. <u>Mainstream Segments</u></b>	
• <b>Air Filtration – Surface</b>	<b>Chris Sipes **</b>
• <b>Air Filtration – Depth</b>	<b>Chris Sipes **</b>
• <b>Liquid Filtration – Non-sterile</b>	<b>Tom Birchard **</b>
• <b>Liquid Filtration- Sterile</b>	<b>Marcela Munzarova **</b>
<b>3. <u>Early Adopters Segments</u></b>	
• <b>Performance Apparel</b>	<b>Fred Lybrand **</b>
• <b>Acoustic</b>	<b>Tom Birchard **</b>
<b>4. <u>Innovators Segments</u></b>	
• <b>Battery Separators</b>	
• <b>Battery Electrode Organic</b>	
• <b>Hygiene</b>	
• <b>All Medical</b>	
• <b>All Inorganics</b>	
• <b>Structural composites</b>	

# How do most customers see Elmarco

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- No product yet commercialised or one or two, does not utilise a line
- Complain about high cost (low throughput), which means it is not competitive and can therefore not replace their current products
- Not sufficient differentiation (in terms of product properties) from their standard (fine) meltblown products
- Fibers often not durable enough, lacking mechanical strength
- Higher MFD required, probably this should improve the cost model
- Looking into other applications than their main business
  - Air filtration company looking into liquid filtration or vice versa
  - Hopes that there is less competition, higher prices
- Most asking for references to already commercialised NF products
- Often discouraged by the complexity of developing a NF product - adhesion problems, aftertreatment (higher cost, defects, etc.)
- Feeling a new product will “cannibalise” their existing products selling well
- They like the potential and want to be among the first to introduce the technology (typical Innovators and Early Adopters), but cannot yet develop or discover the right products for the right applications

# Evaluation and Decision

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- We are still much too “broad” in our approach to projects (application and polymer development, sampling and customer specific developments) = not focused enough, which should mean that we will not find the “beachhead” and will not make it to the mainstream markets
- Narrowing it down to one or two applications or market niches is advisable, but would have a lot of impact on the way we do business, on our organisation, on qualification needs, etc. For example, for this selected application we would need to find real application experts
- Contrary to the literature, selecting the right niche and preparing a plan of how to become market leader within that niche is not only a marketing effort, but in our case very much a R&D task (first improving our technology for this specific purpose, developing and optimising the processes, finalising the products), which would take a lot of time
- It would probably also mean to change our sales approach, or to drive sales activities very much down, until we are ready to “attack” the selected niche; Which triggers then questions concerning the sustainability of our customer service organisation (sales and sales offices, sales reps, customer support incl. sampling)

# Market Segments Available

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## **Air filtration – Surface (excluding industrial filtration)**

- Pros: good application & supply chain knowledge, only few technical challenges (IPA resistance, fog test), products are already out in the market, Polymers available
- Cons: small market, no real need for NF materials (might change with new norms - discharged filters), for us as machine producer rather too small a niche to qualify for mainstream?

## **Air filtration - Depth**

- Pros: far bigger market than surface
- Cons: technical hurdles (gradient filters, composite design, polymers), adhesion issues (filter cleaning), throughput issues

## **Air filtration - Industrial**

- This is about baghouse and cartridge filters for industrial dust collection, higher temp. requirement (often 150C and higher), competing against eg. ePTFE composites or Polyimide composites
- Pros: said to be a big market, dominated by companies like Donaldson, Gore,... Potentially huge demand for alternative products; Higher basis weights = more machines to be sold
- Cons: substantial development needed (adhesion, high temp Polymers, aftertreatment), very little application knowledge in-house

# Market Segments Available

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## Performance Apparel

- Pros: real market demand (to replace ePTFE membranes), high volume, cost model achievable (if we improve technology)
- Cons: need to solve after-treatment (hydrophobisation), Polymer needs to be optimised (PUR?), most probably further technical hurdles to be solved (shrinkage, durability, abrasion, further processes like lamination)

## Liquid filtration

- Pros: partially known (customers), might be high volume applications (like water treatment)
- Cons: nearly no application knowledge, lack of polymers (eg. durable for fuel filtration), long development time anticipated, unknown cost position Not well known benefits of NF (improvement of flow rate?)

## Battery Separators

- Pros: potentially huge market, DuPont starts commercialisation now which could trigger a wave of imitators and indicates that NF can work for this app.
- Cons: still little application knowledge, lot of technical challenges (strength, defect rate, temperature, polymer), cost challenge, experts opinions greatly differ: from not-applicable to great potential = high risk application (hazards like high temp or risk of explosion); Markets will develop slowly

# What We Do Nowadays

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## September 2012

- Focus on 2-3 key application areas
  - Surface loading filtration – ongoing
  - Depth filtration
  - Performance apparel
- Understanding the necessity to increase to throughput
  - Key project started with goal to double the throughput by reducing the cost
  - Single-purpose machine approach accepted
- Quality standards improved
- Limiting the other activities related to the application areas and sampling closely related to preferred applications
  - Visionaries – support them to come up with a “Technology Solution”
  - Pragmatist – extensive sampling serves to reduce their risk perception