



NANOPOOL

From an Idea to a Leader of Technology

**An Overview on Nanopool GmbH Based on a
Guest Lecture and Literature for Technology Entrepreneurship by
Wolfgang Runge**

Mit einer Idee zum Technologieführer

Sascha Schwindt (Nanopool GmbH)

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(<http://www.nanopool.eu>)

About



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- **Sascha Schwindt:** Managing Director (Geschäftsführer) of Nanopool GmbH (LLC) in Hülzweiler (State of Saarland) – together with his mother Lilly Schwindt as the second Managing Director
- Born 1975
- Study of business administration (Diploma) and psychology, University of Saarbrücken
- *Technical bent* - inventor or co-inventor of several technical patents

About Nanopool



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- Founded in 2001
- *A family business* (limited liability company - LLC); financed essentially by the family
- In 2008 about 20 employees
- *Export-oriented*; focusing on Germany, Europe (UK, Austria, Switzerland, Cyprus) and Turkey
- Most success in the UK

The “Idea” for Firm Foundation



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- A special kind of surface coating – with “liquid glass” (SiO_2)
- A scientist from the research institute INM Saarbrücken (Institut für Neue Materialien) presented an obviously untreated, rather *porous* (Ytong) stone to Sascha Schwindt’s father. He poured water onto it: the stone was not wetted; no water was hold back, it was just repelled (cf. also [1])
- Scientist’s question:
Can we do something with that?
What can we do with that?

Market Considerations [2]: Nanocoatings



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- *A significant niche market* with global revenue exceeding \$600 million in 2008; estimated: > \$6.5 billion by 2015
- Key markets:
 - Packaging, household care, healthcare,
 - Buildings, automotives, textiles, electronics
- Most promising functions:
 - Easy (self-) clean; scratch resistance,
 - Anti-corrosion; anti-microbial; stain repellent, barrier features

The Opportunity



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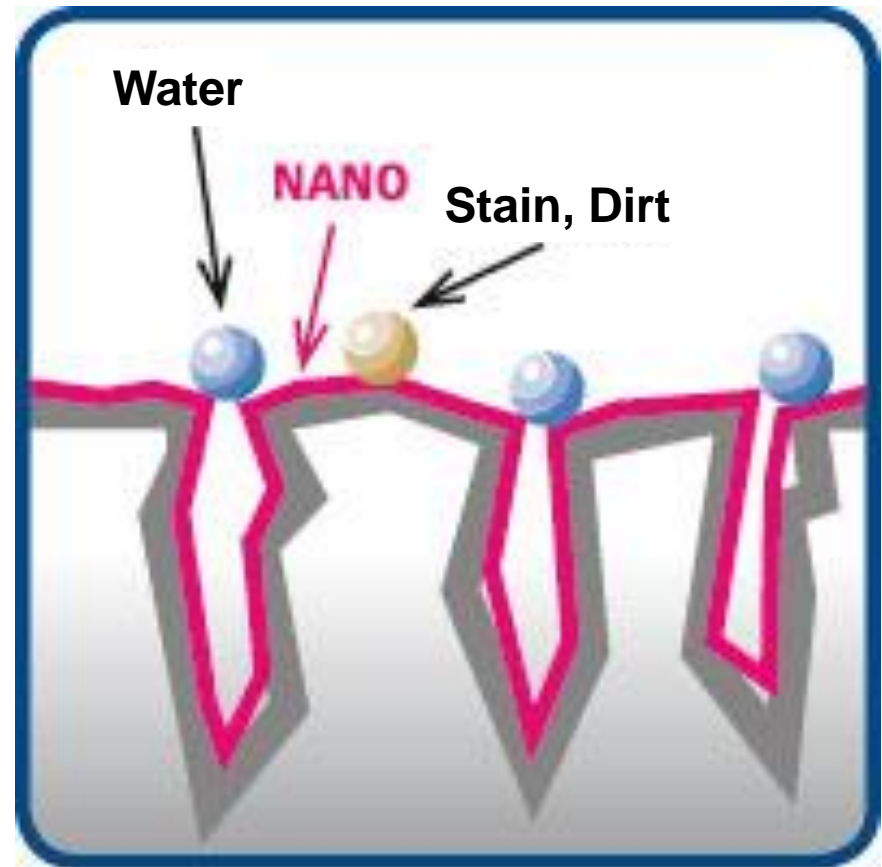
-
- “Liquid glass” coatings
 - Tested by accredited labs and supported by certificates
 - completely inert, food-safe and skin and mucosa friendly;
 - no negative physiological impact;
 - environmentally safe;
 - anti-bacterial variants possible

Can be used for protecting (key areas in bold)

- Almost *any kind of substrate* (material) – **stones**, cement, **ceramics**, **metal**, **textiles**, **glass**, **plastics**, wood, cork, plants, vegetables, etc.
- *Applications, markets:* End-users/consumers (DIY), professional, industrial *customers*

Liquid Glass Effects

- After primary surface cleaning, the coatings become stable within minutes
- Ultra-thin film is heat resistant, has high flexibility and dilatibility
- Water “washes up” stain, dirt, scale, bacteria and fungi



(From: <http://www.der-nano-shop.de/>)



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Liquid Glass Application Specifics

- *A natural, antibacterial property* to the layer of liquid glass:
bacteria or other microbes on the glass surface are not killed, but they cannot divide and replicate easily
- Sprayed onto *outdoor stone or brick*:
a water-resistant surface that is easier to clean,
allows the stone to breathe,
prevents a build-up of mildew under the nano-coating
- Sprayed on *seeds*:
not just *protecting* against fungal attacks,
but *germination and growth faster* than untreated seeds



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Deliverable Functions

- Easy-to-clean surfaces (*with just water*, → household)
- Antimicrobial surfaces (→ hospitals, restaurants, kitchen, bathrooms, etc.)
- Perfect transparency
- Breathable at the molecular level (barrier; → protecting plants, crops, fruit without hindering growth)
- High durability, protection against abrasion
- Scratch resistant surfaces
- Filthiness repelling surfaces, stain repellency
- Protection against corrosion
- Protection against humidity
- Protection against acids and bases, solvents

Substrate ‘nanoed’ with great ease and at very low cost

Chemical Nanocoatings: Particles and Layers



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- Coatings based on water- or alcohol-based *Sol-Gel process* (well-known to chemists)
- Result: an *ultra-thin layer* of polymerized SiO_2 (80-100nm thick); *technology patent protected*
- Nanopool technology *does not involve any nano-particles* (nanotechnology currently under scrutiny for adverse health effects!)
- Ambiguity in defining “nano”: primary particle size vs. agglomeration of smaller particles

Yes, We Can: ***The Firm's Core Competencies***



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- *Development and production of ultra-thin surface protection systems for nearly every type of material (substrate) or field of application*
- *Formulation of products (adaptation of the Sol-Gel process) to change the properties of various substrates and add new functionality (“customization”)*
- **Marketing, sales and distribution**

A Promising Start



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- Further developments, application testing
- Revenues from selling via retailers
- Working on projects with many of the world's leading retailers and industrial groups
- Self-image [3]:
“The world leader in the field of particle-free SiO₂ nanolayer technology”

A Disturbing Setback [4, 5]



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- In March 2006 aerosol household sprays that may or may not have contained nano-particles were pulled off the market in Germany!
- *Respiratory problems* among people using the Magic Nano sprays;
are based on Nanopool products designed to coat glass and ceramics; aerosol sprays prepared and marketed in the retail sector by Kleinmann GmbH
- *Investigation:*
no nano-particles in the aerosol, *Nanopool not responsible, no “nano scare”*;
ill-formulated products by distributor Kleinmann
(original pH of the formulation was 2.4, which was increased to almost 8 through the addition of NaOH)

Some Consequences



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- Financial losses; damage of reputation/image
- Cutting all relationships with Kleinmann firm
- *Redefinitions:*
 - Basis of relationships with partners,
 - Organization of distribution and sales
- *Even more emphases on product tests, certificates and experts' reports by accredited independent institutes and labs concerning environmental health and safety matters*

Back on Track



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- *All of the Nanopool products meet EU criteria* for certification as physiologically safe, food safe, compatible with human skin, free from nano-particles and environmentally friendly
- Golden Green Apple Award for the most innovative and environment-friendly products of the year (promoted by the British government)

In the UK:



2009 Smart Solution Award

for developing protection against “*Infections in Hospitals*”

Business Concept



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- Developing and customizing own in-house products
- Educating and training users
- Selling directly and establish sales representations
- Selling via distributors
- Licensing agreements for multi-national brand owners (OEMs)

- Option: technology or company buy-out by multi-nationals (e.g. Procter & Gamble, Unilever, but also Dow Chemical)

Development



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- Patents, for instance

Patent Number	Title	Inventor
WO2009074124 (A2) — 2009-06-18	Protective layer for plants and trees, the production thereof and use thereof	Schwindt Sascha [DE]
DE102007034724 (A1) — 2009-01-29	Preparing a composition, useful to coat e.g. textile materials, shoes, diapers, airplanes and plastics, comprises dispersing a gel-forming material in an aqueous solution and adding cyclodextrin derivative to the dispersion	Buschmann Hans-Juergen [DE]; Schwindt Sascha [DE]
EP1825752 (A2) — 2007-08-29	Coating compound made of an agent which generates SiO ₂ with at least two antibacterial agents	Juergens Ralf [DE] ; Schwindt Sascha [DE]

- Analytical and structural activities by outside services
- Coop with university and industrial partners

Nanopool Product Differentiation - 1



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- *Application Process*: Two stages – pre-clean to prepare the surface after which the treatment can be simply wiped or sprayed on
- **Application Tools**: *Cleaning cloths* (particularly for household in the kitchen – cooking and baking - oven, ceramics and stainless steel) or *spray devices*
- **Product Differentiation**: >30 different products each tailored to specific needs; two grades of product
 - Domestic
 - Janitorial (greater longevity and is suitable for heavy use environments)
- **Two Kinds of Formulation**:
the *standard anti-microbial* (a totally inert surface on which microbes cannot breed) and *anti-bacterial* which contains an additional bactericide (EU standard)

(Cf. Ref. 6-9)

Nanopool Product Differentiation - 2



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- *Cost savings* (e.g. in hospitals and healthcare environments) [9]:
 - (Almost) everything can be ‘nanoed’ in seconds, and for just a few pence: one liter of Nanopool treatment will cover 300m² of glass or plastic. Previously, molded anti-bac sink units cost hundreds of pounds and door handles cost £20-£30 (in the UK).
 - Approved for use on furniture and soft fabrics by one of the UK's leading retailers



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Demonstrations - 1

- Many companies, hotels, restaurants and medical establishments in Germany, the UK, China and Austria have enjoyed savings in cost and environmental impact:
 - McDonalds in Salzburg (Austria) achieved savings of 40%.
 - Tests in Kempinski hotels showed that bathrooms which were treated with NP technology were "easy to clean" and bacteria free even after 8 months
 - UK trains, both inside and out

Demonstrations - 2

- Stone Monuments and Environments
 - For 18 months, scientists in Turkey have been running trials on the *Ataturk Mausoleum in Ankara and a 15th-Century mosque*. They report continued water protection and no discoloration. Talks are taking place about the possible use of liquid glass in Britain to protect memorials and war graves.
 - Protecting a historical fountain and surrounding place against “corroding” water and graffiti in Spiesen-Elversberg (Germany) [10].
 - Protection of a place (“Neuer Platz”) in Klagenfurt (Austria) against “pollution” and ease cleaning, e.g. from chewing gums [11].

Experimental Developments



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- Treat clothing and other materials to make them stain-resistant.
- Vineyards are testing it against a common grape fungus
(vines becoming resistant to fungal diseases)
- Wine makers are interested in using the product to prevent "corking" (coating corks with liquid glass to prevent "corking" and contamination of wine;
cf. Nanopool Wine Industry:
<http://www.youtube.com/watch?v=mxHzWmJZTNM>)

But!

- "Many UK supermarkets are unwilling to stock the technology as many of the other cleaning products which they sell will become redundant. This is *also the case with some major cleaning companies* who are scared of having to clean less frequently and to change from using cleaning chemicals to using water in most instances." [7]

Educating and Training Users

- NP Akademie GmbH (*NP Academy*) since 2008 (<http://www.npakademie.de>)
- Courses (with certification) organized in German or English in cooperation with IHK (Industry & Trade Chamber) Saarland
- Nine modules (in German or English; total 90 hours)
 - Basic knowledge and practical skills in chemical nanotechnology
 - For attendees from food, restaurant, painting, industry, surface treatment, cleaning areas

Marketing Nanopool Products



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- *Web-site* in German, English, Norwegian, Russian, Turkish, Chinese
- Promotion via *mass media* (Europe-wide)
 - Newspapers,
 - TV spots
 - YouTube Presentations
- Promotions via *special (technical) literature*

Distribution



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- A broad variety of approaches
 - **Regions:** Europe from Northwest to Southeast, from the UK and Ireland, across German-speaking countries to Cyprus and Turkey
 - **Channels:** direct selling, cooperation, representations, distributors

Direct Selling: nanopool Shop



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- *nanopool Shop*: DIE NANO EXPERTEN[®] (The Nano Experts); subsidiary of Nanopool GmbH; together with CCM GmbH [12]
- Web-based selling (<http://www.der-nano-shop.de/>); eCommerce focusing on

Applications:

- Aquarium
- Automotive
- Bath Rooms
- Garden
- Kitchen

Substrates:

- Wood and Plastics
- Steel and Metal
- Stones and Bricks
- Glass and Ceramics
- Textiles

Distribution: Sales via Coop



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- **CCM GmbH Creative Chemical Manufacturers**
(a sales cooperation of eight medium-sized manufacturers launched by Bernd Zimmermann, formerly sales manager at German cleaning product firm Kleinmann GmbH)
- CCM GmbH goals:
bundle the synergies and strengths of several leading chemical manufacturers in order to establish a common international sales platform;
enable partner clients to purchase products more efficiently, reduce also administrative costs



Distribution: Representations

Sales representations through dedicated firm foundations:

- Nanopool Schweiz AG, 6300 Zug, Switzerland
- Nanopool Vertriebs GmbH, 5101 Bergheim, Austria

Product use by large cleaning services firm in Germany:

- Nano Disch [13]:
Disch Gebäudereinigungsservice GmbH, (facility cleaning services, > 600 employees) – uses Nanopool products and its applications for its broad range of cleaning services as a core competency

Distribution: Sales via Distributors



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Nanoland

- **In Ireland and UK**

(<http://www.nanoland.net/Home.html>;

http://www.nanoland.net/Liquid_Glass_1_.pdf)

- **In Cyprus**

by Technology Marketing Management

(<http://www.technologymarketingmanagement.com>;

<http://www.nanolandcyprus.com/>)

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