

# **BEST PRACTICES IN RDI IN THE FURNITURE INDUSTRY IN THE NORTH-WESTERN REGION**

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SMART FURNITURE SRL CLUJ-NAPOCA

*ORADEA, RDA-NV, OCTOBER 26<sup>TH</sup>, 2016*

# A FEW WORDS ABOUT ME ...

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- Specialist in quality engineering and **new product development**
- Technology transfer and **relationships with clusters** (since 2012)
- **Office manager** within Danube Transfer Centre Cluj-Napoca (6 units)
- Bachelor in robotics and doctorate in **industrial engineering**
- R&D manager @ **Smart Furniture SRL** for 1.5 years (2014-2015)
- Member of 3 European vocational training projects and team leader of 1 European **innovation support project**, experience as trainer in the EaP region
- Member, executive or consultant for many **structural funds projects** in the fields of human resources, research infrastructure, innovation and others
- Consultant for industrial companies to implement **quality management systems, develop new products and improve manufacturing and business processes**
- Expert or collaborator to **scientific and professional** events in the field of engineering and management



# TRANSYLVANIA FURNITURE CLUSTER

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- A history of more than **4 years** with many significant results and projects
- 38 companies, 6 universities/institutes, 2 local authorities, 12 catalyst/support entities
- **Successful projects:** the competitiveness pole (over 5 mil. euros), the “old” cluster project (cca. 85.000 euros), the “new“ cluster project (over 2.5 mil euros), many individual investment projects
- The **Technical University of Cluj-Napoca** is present through specialists in new product development, industrial design, architecture, modern materials and even power engineering
- A proposal for a **common research infrastructure** in the field of furniture testing is under discussion

**Source of data:** <https://www.mobiliertransilvan.ro/>



# TRANSYLVANIA FURNITURE CLUSTER



- CMT is one of 8 Romanian clusters that have achieved **silver label certification** from ESCA
- Long term development strategy with **focus on export** and increasing the number of members
- Ever-increasing **lines of products** and **continuous improvements** in all aspects related to business, including the integration of RDI
- Continued preoccupation for **development** through investments



Source of data: <https://www.mobiliertransilvan.ro/>



# TRANSYLVANIA FURNITURE CLUSTER

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- Beside the good results, one must also **notice significant challenges**
- Furniture is seen as a field in which it **hard to innovate** (even the project evaluation grids don't give the same bonuses for furniture as they do for IT or other high-tech fields)
- The fight for survival and the tough competition on the market leaves **little time and limited budgets** available for (high-risk) R&DI activities
- The universities, institutes and research units are **not used to (and are not evaluated by)** being focused on applied solutions with market potential





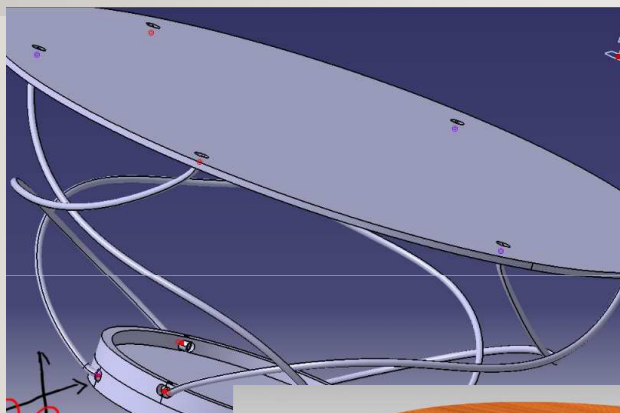
## R&D&I COMES IN

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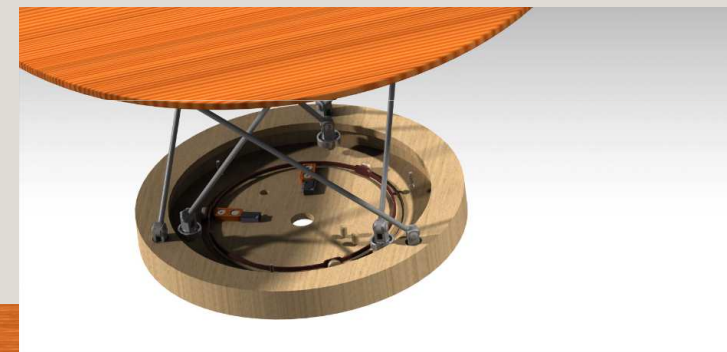
- **2 R&D&I projects** have been included in the CMT Competitiveness pole
- 2014-2015, European Regional Development Fund, POSCCE, I2.P01.001 I3 C3, **Research for developing and implementing into production innovative furniture**, part of the I2.P01.001 Competitiveness Pole “Transylvanian furniture cluster”, Smart Furniture - TUCN, Mihai Dragomir
- 2014-2015, European Regional Development Fund, POSCCE, I2.P01.001 I1 C1, **Research for designing and manufacturing plastic parts for the furniture industry**, Proeli Concept - Ax Perpetuum - TUCN, Călin Neamțu
- A total of **25 scientific articles** have been published
- Also, **13 Romanian and 1 European patent applications** have been submitted
- TUCN, but also the other 5 R&D&I entities and the 3 companies that have developed capabilities in this field, can contribute to innovation based development in all significant areas: design, functionality, materials



## R&D&I COMES IN



- living room table with adjustable height
- patent pending, excellence diploma and gold medal @ Proinvent 2016



SALONUL INTERNAȚIONAL DE INVENTICĂ

PRO INVENT, Ediția a XIV-a, 2016, Cluj-Napoca, România

**DIPLOMA**

DE EXCELENȚĂ  
ȘI MEDALIA DE AUR CU MENȚIUNE SPECIALĂ

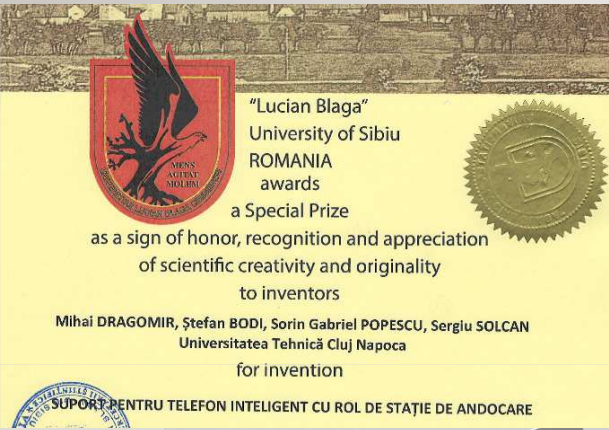
Se acordă Bănfalvi Lóránt Árpád, Popescu Sorin Gabriel, Scurtu Iacob Liviu, Vaida Liviu Călin, Dragomir Mihai

De la UNIVERSITATEA TEHNICĂ DIN CLUJ-NAPOCA

Pentru MASĂ REGLABILĂ PE ÎNĂLȚIME CU MECANISM DE DEPLASARE FAȚĂ DE O BAZĂ FIXĂ

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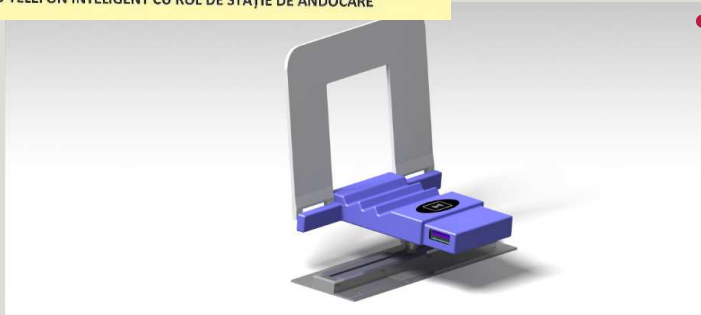
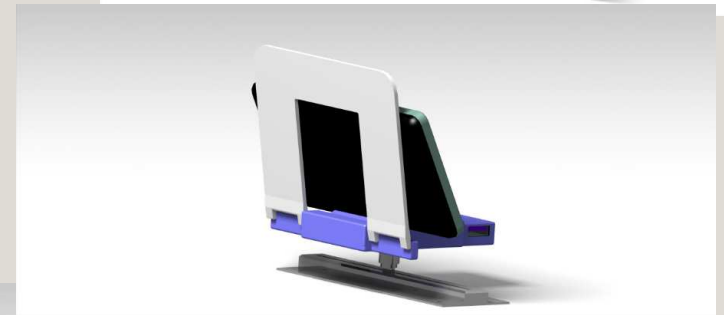
# R&D&I COMES IN



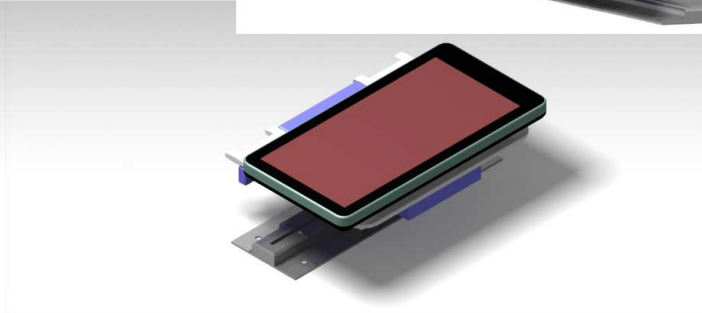
- **smartphone docking station with induction charging and laptop connectivity**



- **patent pending, excellence diploma and gold medal + ULBS Special Prize @ Proinvent 2016**



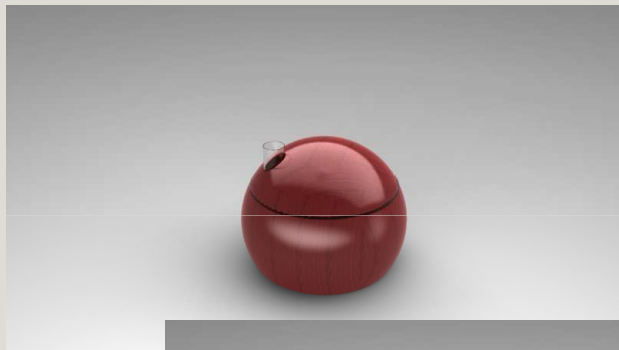
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## R&D&I COMES IN



- multi-functional coffee table
- support function
- storage space
- outlet connector
- patent pending, gold medal @ Inventica 2016



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## R&D&I COMES IN

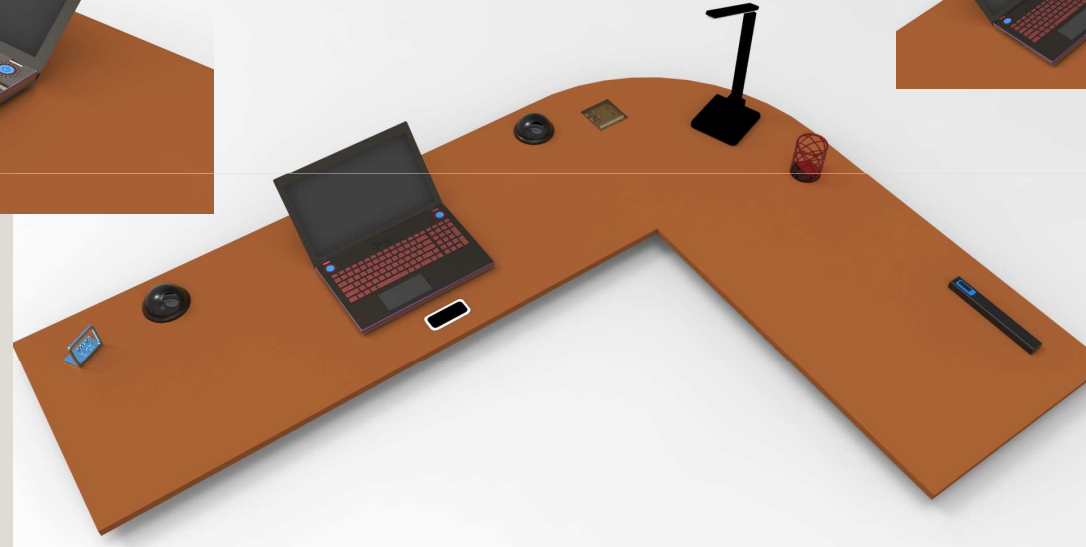
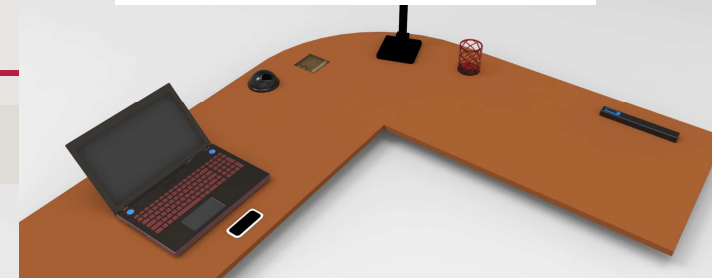


- extendable stool
- single or double seating place
- storage space
- easy sliding functionality
- patent pending, gold medal @ Inventica 2016



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## R&D&I COMES IN



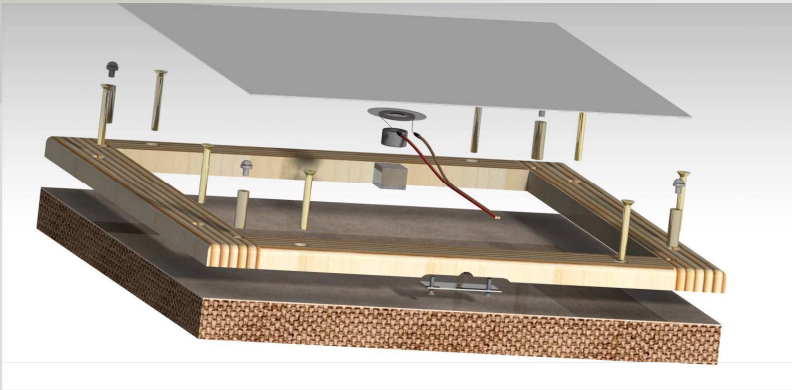
- smart desk
- IT&C equipment integrated for a smart workplace
- docking station, speakers, scanner, wi-fi clock, light sensitive lamp, etc.

- smart desk
- developed using morphological charts
- published in an article in Energy Procedia - Elsevier journal

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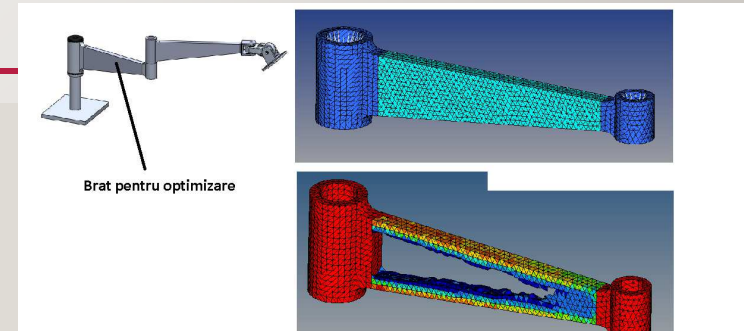


## R&D&I COMES IN



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- studies concerning product development
- studies for form optimization
- studies for mechanical design solutions
- studies for acoustics integration
- studies for process configuration
- and so on

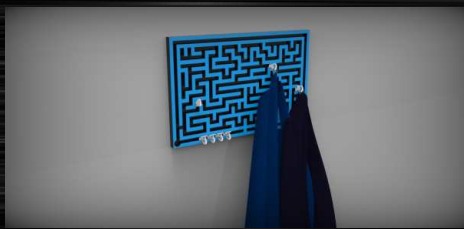
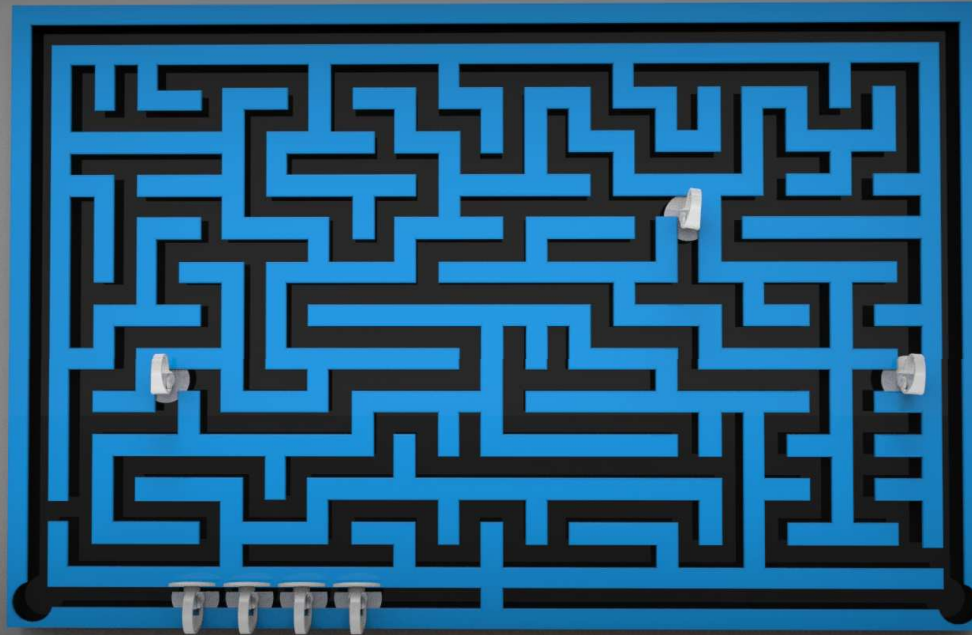


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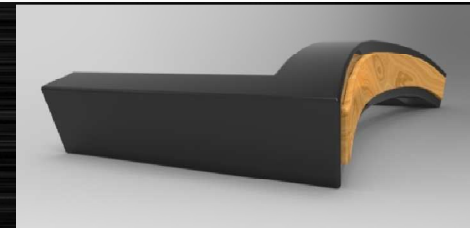


## Maze - coat hanger for children



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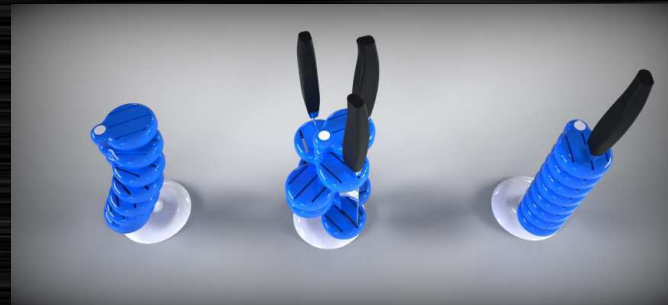
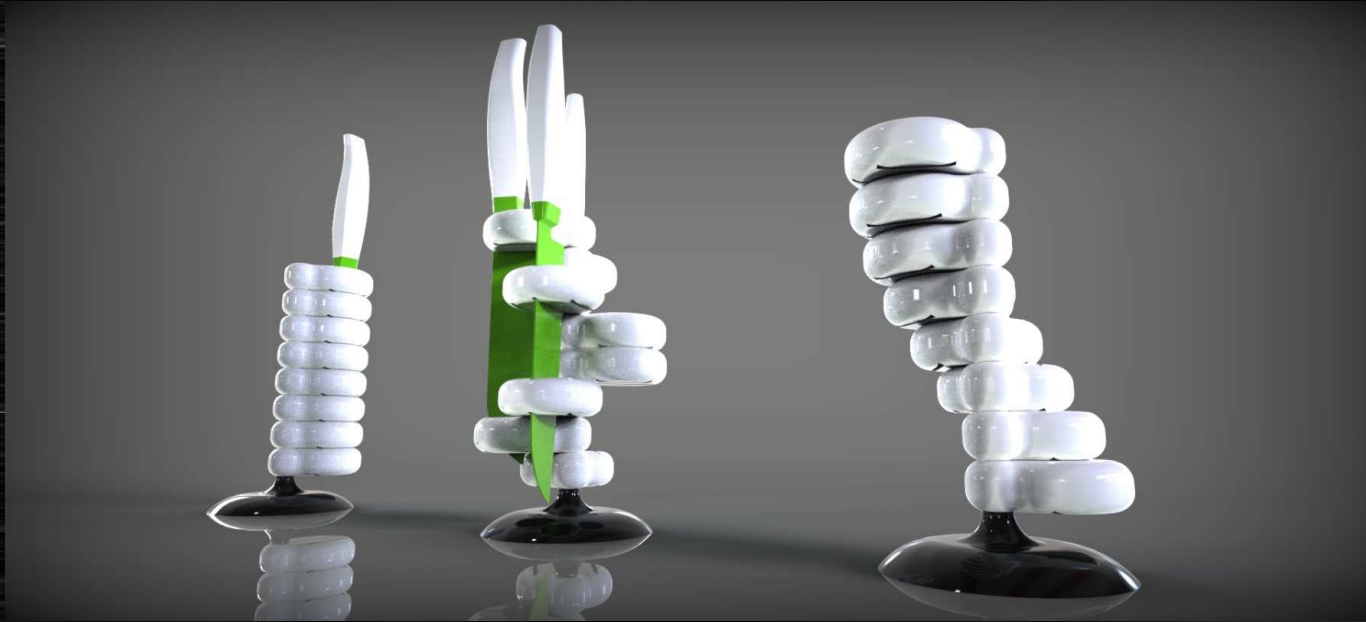


## Direct citrus juicer





## Reconfigurable knife holder



# FROM TRADITIONAL TO DIGITAL

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- **ASTERCRIG - The multi-disciplinary evaluation of imperial gates from churches** from the XV-XIX centuries in order to conserve and restore them (...) - PN II project financed by the Romanian Government and lead by Babeş-Bolyai Univ. (TUCN is partner in the area of digitization and reconstruction)
- Even **“old wood” can become “smart”** and the restauration process is more accurate and



Imperial gate from the Așchileu Mic church



Source: <https://sketchfab.com/astercrig/models>  
Copyright: © ASTERCRIG Consortium

Restored  
imperial  
gate from  
the church  
in Nicula



Imperial  
gate from  
the Cluj  
Etnographi  
c Museum

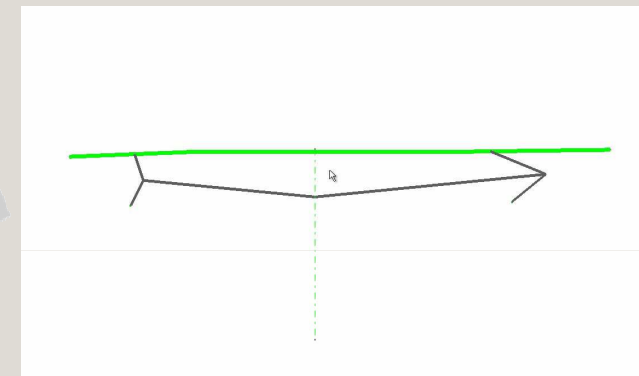
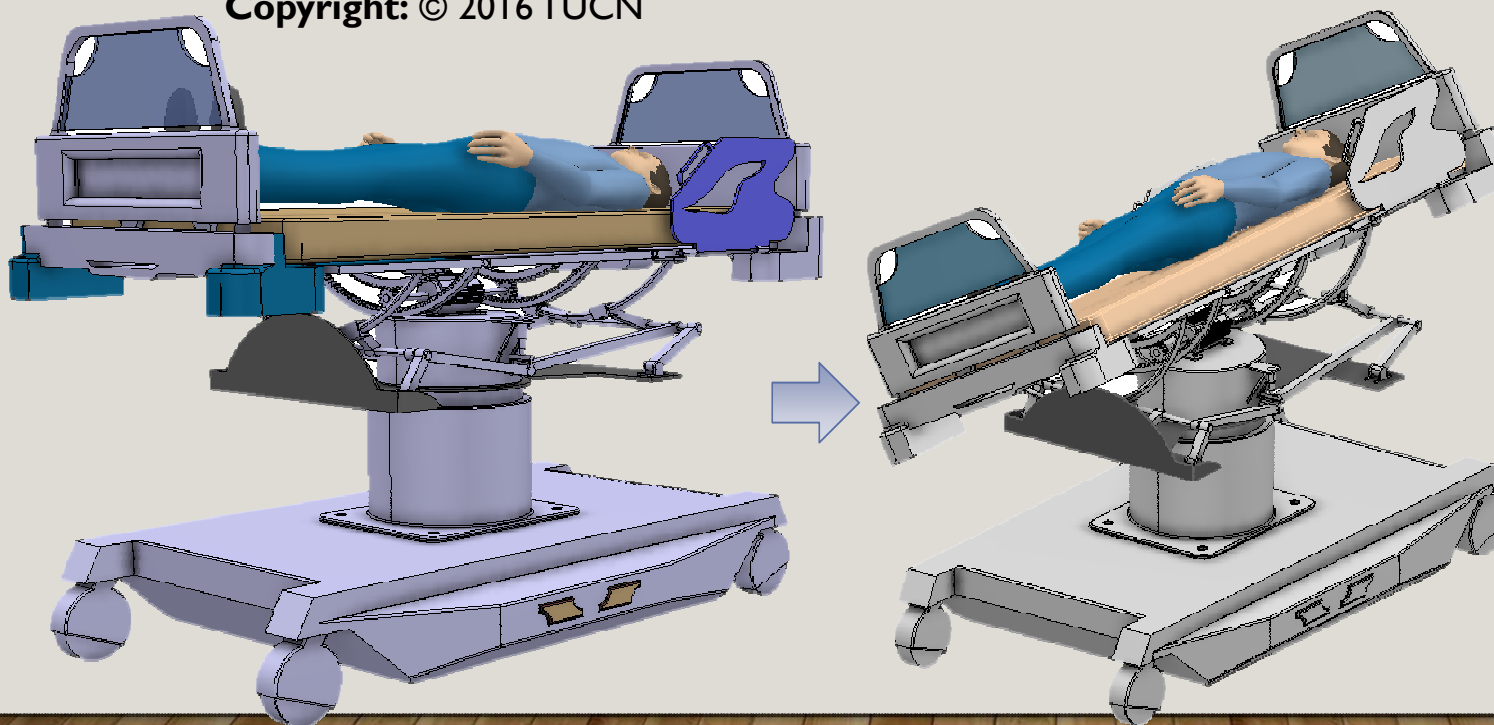


# OUT OF THE „WOODEN” BOX



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- **Smart hospital bed**
- Ag+ Composites
- I folding actuator
- I rolling actuator



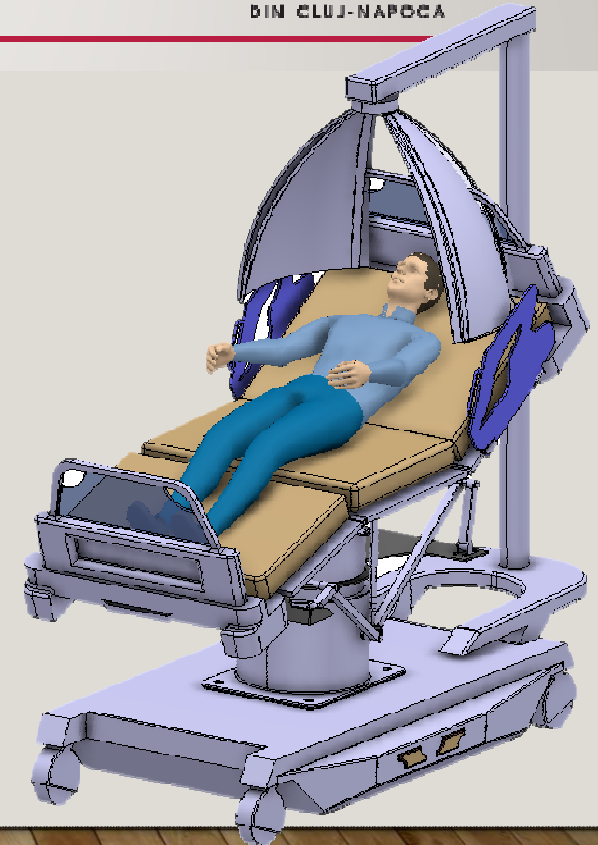
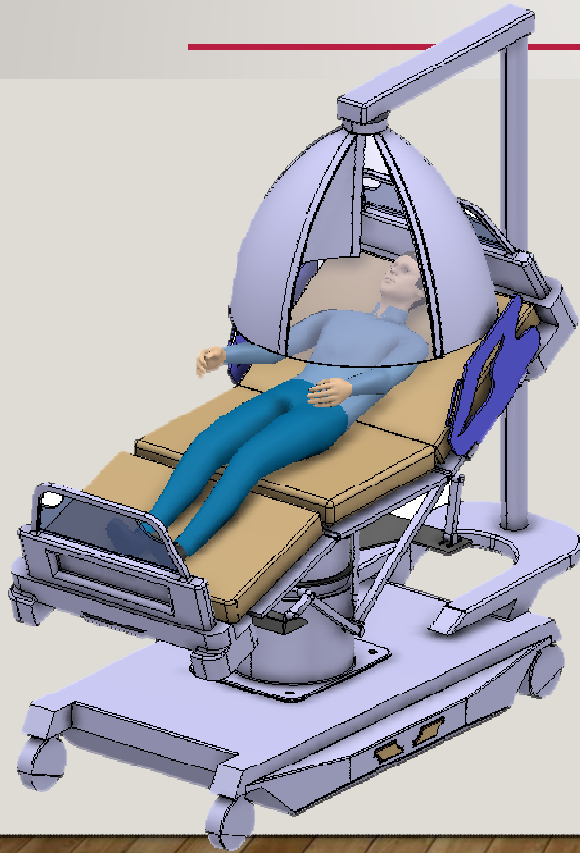
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- **“self-care” smart system** based on tracking camera / MS Kinect: commands bed movements to avoid bedsores, tracks temperature in real-time, can be extended with sensors
- **“personal environment” smart system** based on retractable cupola: for isolation, relaxation, entertainment, reading, etc.

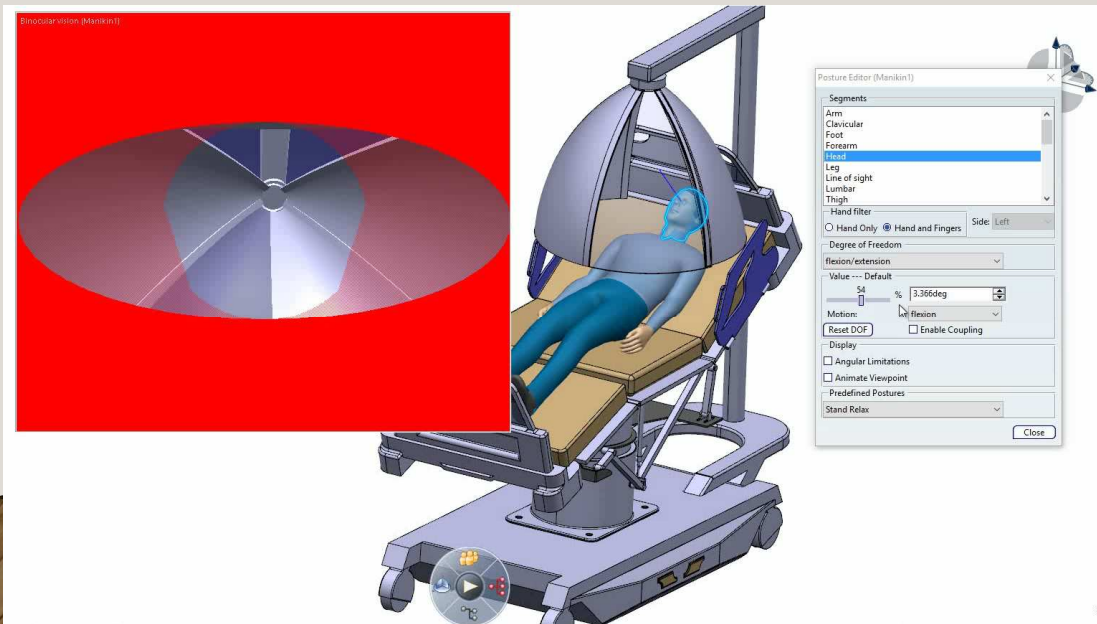
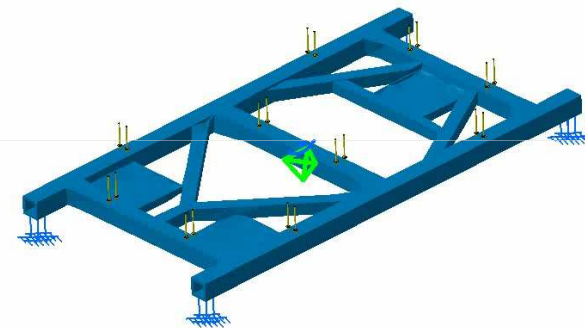


# OUT OF THE „WOODEN” BOX



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- Finite element **simulation** results
- Functional and ergonomics **simulation**



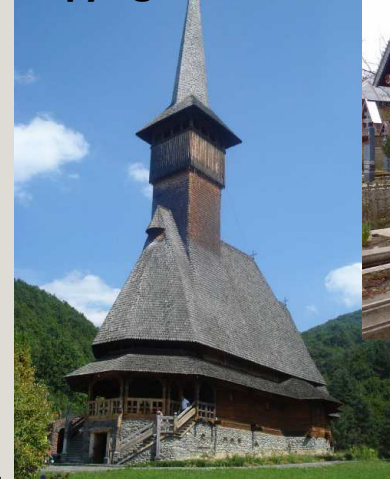
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# TRADITIONAL WOODWORKING - ONE WAY TO GO

- Traditionally, in Transylvania, there are some amazing wood workers, that employ **time-tried techniques**
  - The gates from Maramureș
  - The Merry Cemetery in Săpânța
  - The wooden churches
  - The painted/sculpted furniture of the Szekelys
- The **value-added potential is low**, products are artisanal, processes are undefined
- The **market is limited** and somewhat experimental

Source: <http://www.mara-maramures.ro/galerie-foto/page,2>

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Source: [http://www.sznm.ro/sznmr.php?o=scaun\\_1716](http://www.sznm.ro/sznmr.php?o=scaun_1716)

Copyright: © 2016 Szekely National Museum

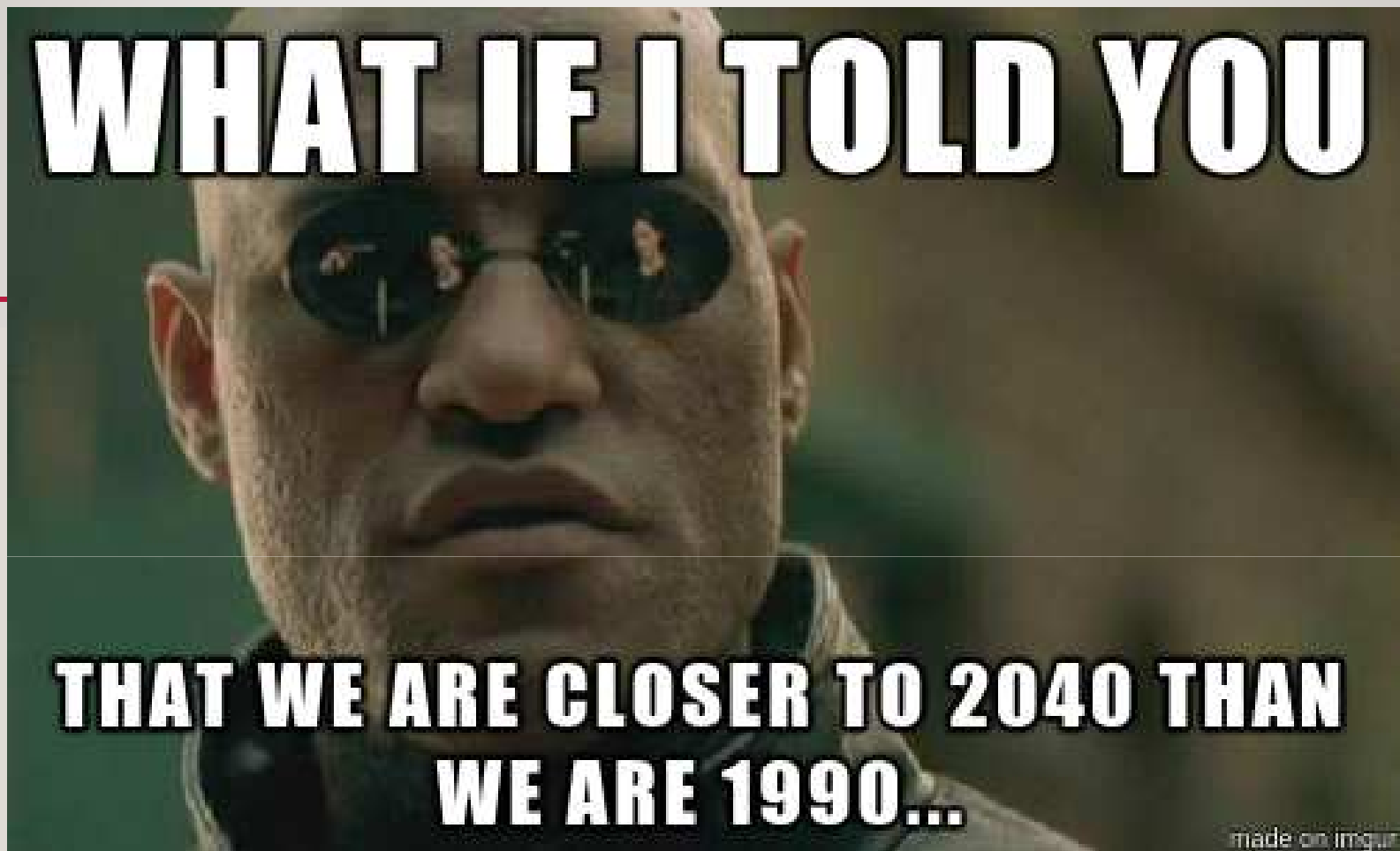


# COMPETING ON PRICE - ANOTHER WAY



- Regular, **undifferentiated** products, that appeal to large market niches
- **Cheap** materials, **cheap** labor, no significant design innovations, no function innovations
- Most significant feature is the **ability to customize** it according to the requirements of the space, the wishes of the customers and the trends of the moment
- Will provide **survivability** but will never be able to compete with “garage” handicraft business
- **Difficult to enter specialized** stores where the competition comes from cheap international manufacturers (e.g. China)





2016 - 1990 = 26 years

2040 - 2016 = **24 years**

Even if furniture is one of the most traditional industries, change is just around the corner





# TRENDS AND OPPORTUNITIES

**Regio**  
Iniciativă locală, dezvoltare regională

Support for information and publicity regarding  
Regional Operational Program in the North-West region >

- **North-Western Region Development Strategy**
  - Priority domain for the Regional Strategy for the period 2007-2013
  - Smart specialization proposal for the Regional Strategy for the period 2014-2020
  - Some good ideas from the Centre Region Agency (ADR Centru - ID:WOOD) project contains a plan to develop a (shared) regional technology center for the furniture industry
- **Horizon 2020 - EU RDI - NMBP-05-2017**
  - Advanced materials and innovative design for improved functionality and aesthetics in high added value consumer goods
    - „Novel, higher added-value, better performing, sustainable, versatile, appealing designs and creative solutions for consumer goods
    - Good integrability of the proposed innovative materials in final products
    - Promoting new collaborative innovation strategies and practices along the value chain”



Source&Copyright: © 2014 Ioan Zăbală,  
Mihai Petruse, Mihai Dragomir

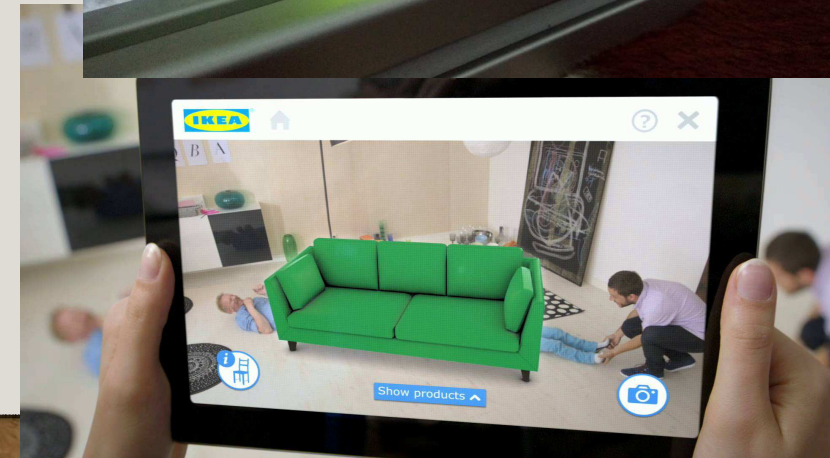
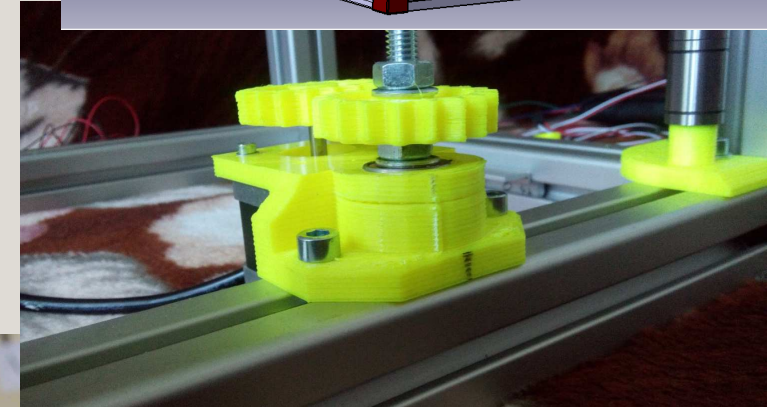
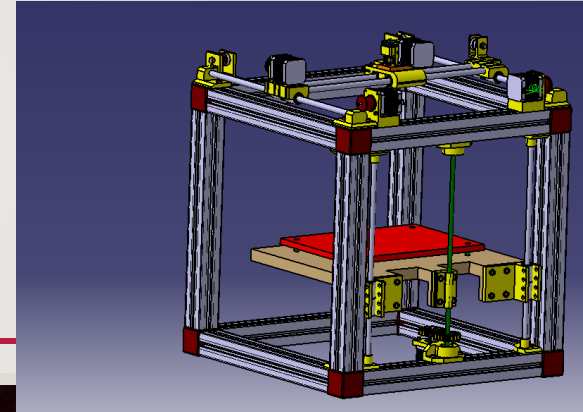
# TRENDS AND OPPORTUNITIES

- **3D printing**

- Used in the previous projects for making and testing prototypes
- Faster and cheaper solutions being created all the time
- Our students already designed and built experimental versions for diploma projects

- **Virtual / Augmented reality**

- Applications growing exponentially: driving autos, military, tourism, entertainment, medical, etc.
- TUCN has experience with virtual museums and teaching aids made in AR
- Proposed idea for the workshop to discuss AR for interior design and furniture design



Source: <https://www.youtube.com/watch?v=vDNzTasuYEw>  
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# TRENDS AND OPPORTUNITIES

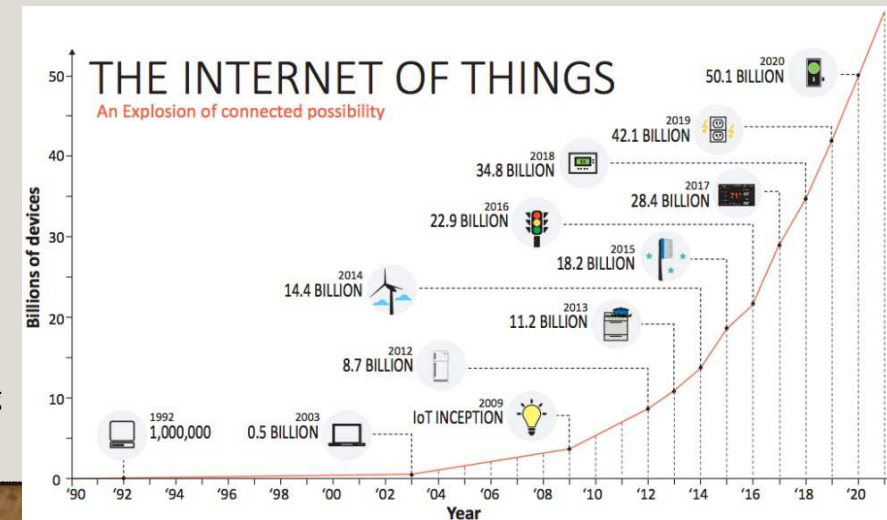
- **Evolution and diversification of design.** E.g. for 2016: design detox, warm metals, rough luxe, retro tech, tailored materiality, seamless functionality  
(Ali Morris, <http://www.interiordesign.net/articles/11310-design-forecast-10-trends-to-watch-for-in-2016/>)
- **Newer and greener materials** will appear constantly. E.g. transparent wood from KTH Royal Institute of Technology, Sweden, researcher Lars Berglund  
(John Brownlee, <http://www.fastcodesign.com/3058621/this-swedish-scientists-transparent-wood-could-transform-architecture>)
- **Influence of the internet of things -> the internet of everything: Smart products that communicate!**

**Source:** Bob Crews, Shailesh Mangal, <http://www.getzephyr.com/resources/whitepapers/iot-and-its-impact-testing>  
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**Source:** ibidem

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# TRENDS AND OPPORTUNITIES

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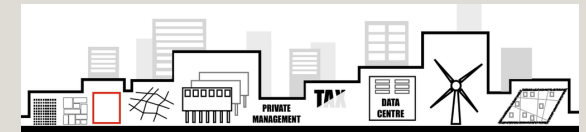


- In the past years, two innovations rewarded by EPO with the **European Inventor Award** have come from the furniture and plastics industry:
- Jürgen Pfitzer, Helmut Nägele from the Fraunhofer Institute for Chemical Technology for the Arboform renewable plastic or “liquid wood” in 2010
- Claus Hämmerle and Klaus Brüstle for Blumotion, a soft-close hinge system for doors, drawers and kitchen cabinets
- Also, other amazing results can be seen everywhere:
- Catalin Sandu and Adrian Iancu’s LifeEdited apartment for Graham Hill, an extreme multi-functional interior design and furniture solution

# SMART FURNITURE - SMART HOME - SMART CITY

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- There is an very powerful trend with the internet-of-things to **merge all the experiences of a person**, from home, to traveling, to jobs, to leisure, **into a single seamless online experience**: smart-everything, self-driving cars, wearable technologies, ubiquitous computing, home VR solutions (e.g. Oculus, Hololens), home 3D printing, etc.
- The industrial environment is experiencing an **unprecedented digital and online revolution**: Industry 4.0 in Germany, National Network for Manufacturing Innovation in the US, Connected! Manufacturing - Industrial Value Chain Initiative in Japan, Made in China 2025 and so on
- **Cluj Innovation City** and **Măgurele Laser Valley** are two ambitious smart city initiative in Romania ... for sure the businesses, the people, the shops, the research centers there will **need all sorts of (smart) furniture!**
- Oradea is currently developing its **smart city strategy** with the help of Cluj IT cluster



**CLUJ INNOVATION CITY**

<http://www.clujinnovationcity.com/>



<https://www.laservalleycompetition.ro/>



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THANK YOU VERY MUCH!

