

# Multi-national pulp industries within the **global value networks** – systemic assessment on the changing operational environment

Ossi Pesälä // Veera Tahvanainen // Teppo Hujala // Jouni Pykäläinen

School of Forest Sciences, Joensuu, Yliopistokatu 7, Finland

## Aim of the studies

- Present the current situation and future perspectives of **pulp-based industry** in Uruguay and Finland
- Analyse their relation to each other in a framework of **global challenges** and **bioeconomy**

## Theoretical framework

- Multi-Level Perspective** model for socio-technological transitions

## Methods

- Qualitative** analysis (expert interviews, document analysis)
- Numerical** expert evaluations

## Next steps

- Expert evaluations in Finland and Uruguay
  - Relevance and magnitude of different drivers at landscape-level
  - Potential and importance of emerging innovations
- Paper 1 to be published at the end of 2019
- Paper 2 to be published in 2020

## Preliminary results:

### Pulp Industries through Multi-Level perspective

URUGUAYAN PULP INDUSTRY			
<b>Landscape:</b> The 'external structure or context for interactions of actors'			
<b>Environment</b> Replacing fossil raw materials Sustainable production Climate change Biodiversity <b>Norms &amp; policies</b> National and international strategies & agreements	<b>Radical drivers</b> Pests & diseases 3rd pulp mill	<b>Markets</b> Bio-, circular- and platform economy Demand for biobased products Consumer awareness Global markets	<b>Society</b> Population growth Urbanization Growing standards of living Public opinion  <b>Technology</b> Digitalization Intelligent machinery Evolving production technology
<b>Regime:</b> The 'rule-set or grammar' of processes, technologies, skills, corporate cultures that are embedded in institutions and infrastructures.			
<b>Norms &amp; policies</b> Forest law 1987 Certificates Tax free zones  Fray Bentos (UPM) Montes del Plata (SE&Arauco) Wood consumption 8,1M tons/yr Pulp 2,7 M tons/year	<b>Technology</b> Brought by MNC's Harvesting, logistics Pulp mill Forestry & silviculture	<b>Markets &amp; economy</b> Large foreign investments 3,6 % GDP Pulp dominated Export dominated; CN & EU  <b>Research &amp; education</b> MNCs in R&E LATU + INIA + University Public education: Univ. + technical level	<b>Society</b> Public discussion: Water, soil, environment, economic impacts Social impacts: Employment, economic growth  <b>Industry structures</b> Short history of pulp industry Land ownership: TIMO's, MNCs, privates Plantation forestry (662 000ha) Eucalyptus (8-12 yr) MNC's established production chains (>700 SMEs) Logistics: road & water Energy production
<b>Niche Innovations:</b> where innovation happens			
<b>Industry structures</b> Infrastructure: railroad Education: competence and info Research: inter-institutional co-op.	<b>Technology &amp; production</b> Pine pulp Processing technology Integrated processing Forestry: silviculture, tree breeding, multiple-use forestry	<b>Business models</b> Biorefinery Network-based Industry integrations Sidestreams	<b>Products &amp; services</b> Paper and packaging: print, tissue, card board Lignin derivatives Dissolving pulp (textiles) Hemi-cellulose derivatives Biocomposites Nano-cellulose Adhesive and glues
FINNISH PULP INDUSTRY			
<b>Landscape:</b> The 'external structure or context for interactions of actors'			
<b>Environment</b> Climate change Biodiversity Sustainable production <b>Norms</b> National and international strategies, policies & agreements	<b>Technology</b> ICT, IOT, AI, Robotics, Digitalization Environmental & nano technology  <b>Radical</b> Global power relations Industry-internal power relations	<b>Society</b> Population growth Globalization, Urbanization Growing standards of living Educational level increase Growing need for energy Environmental awareness	<b>Markets</b> Intergation to other industries Global markets Bio-, platform-, circular- and service economy Sustainability and efficiency Changes in demand for end products
<b>Regime:</b> The 'rule-set or grammar' of processes, technologies, skills, corporate cultures that are embedded in institutions and infrastructures.			
<b>Markets &amp; economy</b> Forest industry: >4 % GDP, Use mainly domestic wood Forest industry: 22 % value of export 1. Paper, 2. Cardboard, 3. Pulp ~60 000 ppl. Forest sector Long history of pulp markets	<b>Society</b> Embedded in culture Recreation Everyman's rights  <b>Technology</b> Harveting & logistics Pulp mill & biorefining Forestry & silviculture Inventory technology R&D	<b>Norms</b> Forest & environmental law (+ related laws), EU legislation, Certificates Strategies and policies  <b>Research &amp; education</b> High level of education Vocational & Higher education Public and private R&D&I	<b>Industry structures</b> ~50 Pulp, paper and card board mills Three main actors: UPM, SE, MG Pulp ~8,2 M tons/y (2018) Forest cover 75 % of land area Private forest ownersip (~60 %) Nordic forest solutions Soft- & hardwood pulp Biorefining (tall oil, turpentine, energy, biofuel, chemicals...)  <b>Products</b> Smart products Biobased energy Dissolving pulp, biocomposites, bioplastics, textiles Lingo-, nano-, mikro-, fibril-, hemi-cellulose Lignin, Tall oil, turpentine, sulphur acid
<b>Niche Innovations:</b> where innovation happens			
<b>Technology &amp; production</b> Utilizing technology from other industries (cloud, robotics, AI) By-product processing Clean Tech, sustainable & efficient production tech.	<b>Industry structures</b> Education and industry integrations Modernized curriculums Research: improving infrastructures & inter-institutional co-operation	<b>Business models</b> Network-based and platform BM Mills as industrial platforms  <b>Services &amp; products</b> Platform and data based services Services in NIPF interfaces Integration to food, cosmetic and pharmacy industries.	

## CONTACT INFORMATION

ossi.pesala@uef.fi  
+358 405232710

veera.tahvanainen@uef.fi  
+358 504902820

