



CORPORATIONS ON THE ROAD TO LOW-CARBON ECONOMY

INSTITUTIONAL DIFFUSION OF CARBON MANAGEMENT



By Henri Mikkola

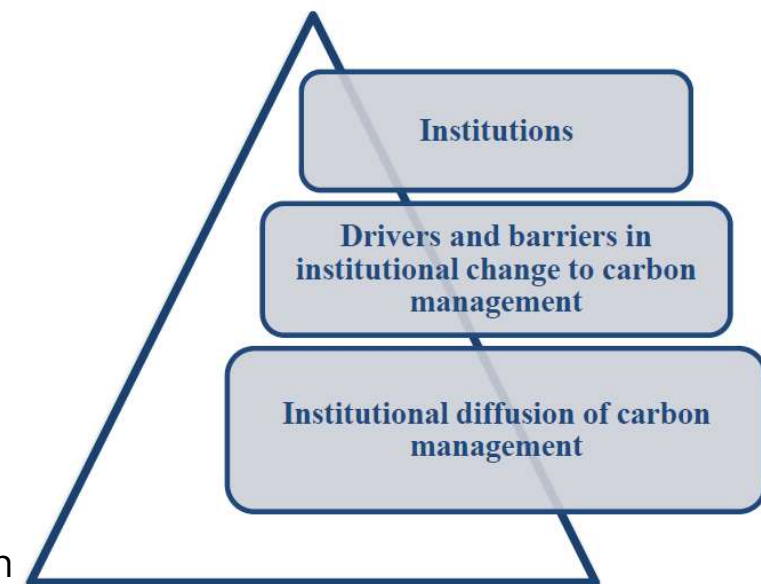
BACKGROUND

- 2050 targets of low-carbon economy
 - Purpose: define institutional diffusion of carbon management
 - Drivers and barriers in institutional level change required to achieve such
 - Institutional change processes efficiency and outcome reflected to institutional diffusion of carbon management
- CDP - founded in 2000 London, independent non-profit organization
 - Information related to climate change, water scarcity and deforestation
 - Promote transparency through surveying (questionnaires) and announcing (reports)
 - 5 different programs; first questionnaire & program 2002 climate change (230 companies)
 - 2016 in numbers: 5600+ companies, 530+ cities, 820+ institutional investors
- Participated to CDP = forerunners, innovative adopters of carbon management
 - 252 companies; top 100 highest emitters each year 2010 – 2015
 - 200 companies (80%) create ~14% global CO2 emissions/year
- Research published online in Talouselämä, and Tekniikka and Talous
- Similar results Swedish AP7 Pension fund



THEORETICAL FRAMEWORK

- Institutions 3 pillars; regulative, normative and culturally-cognitive – central for change and therefore diffusion
- Institutional change necessary to achieve 2050 targets
 - Change from business as usual to carbon management
- Institutional change to carbon management (model)
 - Initiated by 2 mechanisms, which create 3 pressures
 - Direction and efficiency of change defined by 2 components
- Advance to institutional diffusion of carbon management (model)
 - Institutional diffusion not possible without institutional change
 - Traditional diffusion is possible
 - Institutional diffusion has 3 mechanisms
 - Create 3 pressures, the 3 pillars (coercive, normative and mimetic)
 - Institutional diffusion pushes organizations to adopt similar forms, result in isomorphism (=similarity)
 - The form is not efficient from organizational perspective? = Decoupling



RESEARCH QUESTIONS

- Quantitative research, panel data from 2010 to 2015
 - Panel regressions with Stata, Random effects model (Hausman test). Control variables; size and sector (multicollinearity tested).
 - QDA Miner to analyze trends (results quantified)
- 7 main hypotheses formed, with several sub-hypotheses

- Main RS 1: Drivers and barriers in institutional change to carbon management
 - Financial performance
 - Institutional drivers and barriers
 - Through identification of risks and opportunities.
 - Directions in institutional drivers and barriers
 - Trends in risks and opportunities

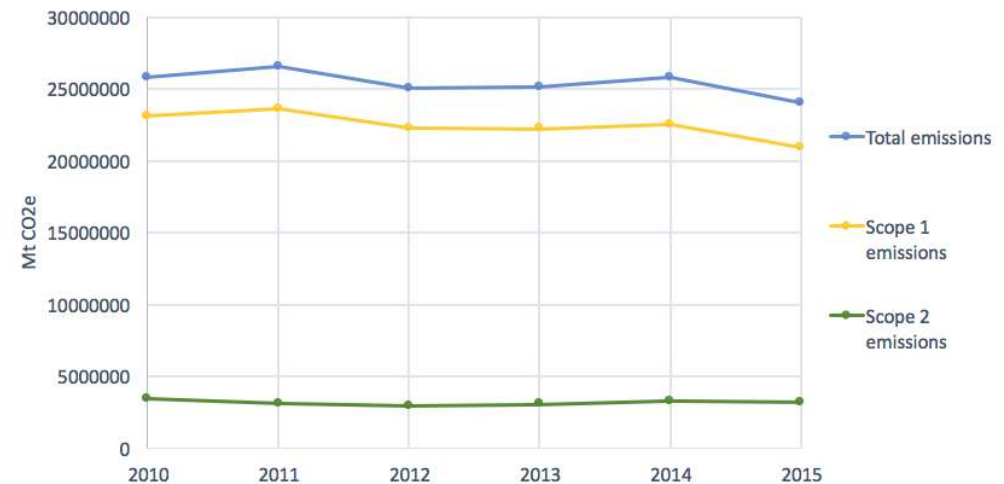
- Main RS 2: Institutional diffusion of carbon management
 - Emission performance
 - Companies are decreasing emissions
 - Width and depth of carbon managements diffusion
 - Institutional isomorphism present; companies have highly similar structure for carbon management
 - Decoupling does not occur
 - Carbon Management Index created



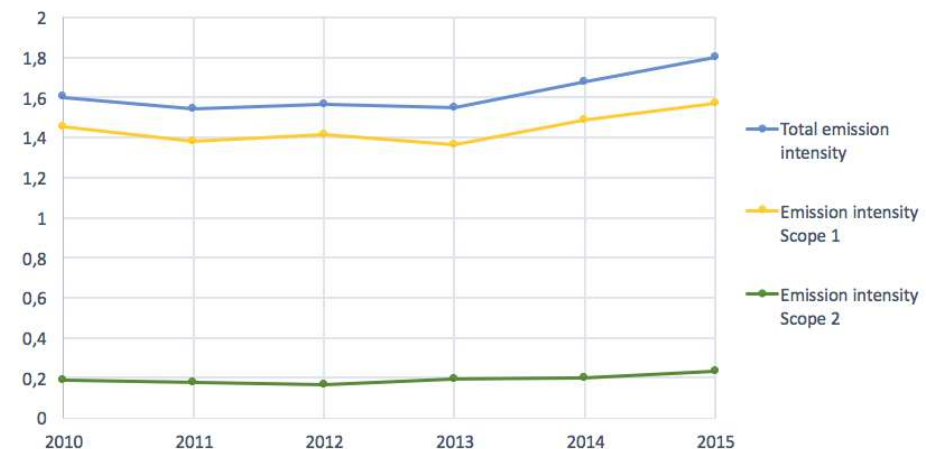
DESCRIPTIVE DATA

- Scope 1 and 2 emissions are actual emissions in metric tonnes CO₂e
- Scope 1 emissions = direct emissions from sources owned or managed
- Scope 2 emissions = indirect, actions of the company but controlled/managed by another company (e.g. consumption of purchased electricity)
- Emission intensity = emissions released per revenue (Net sales) generated

Absolute Emission Averages



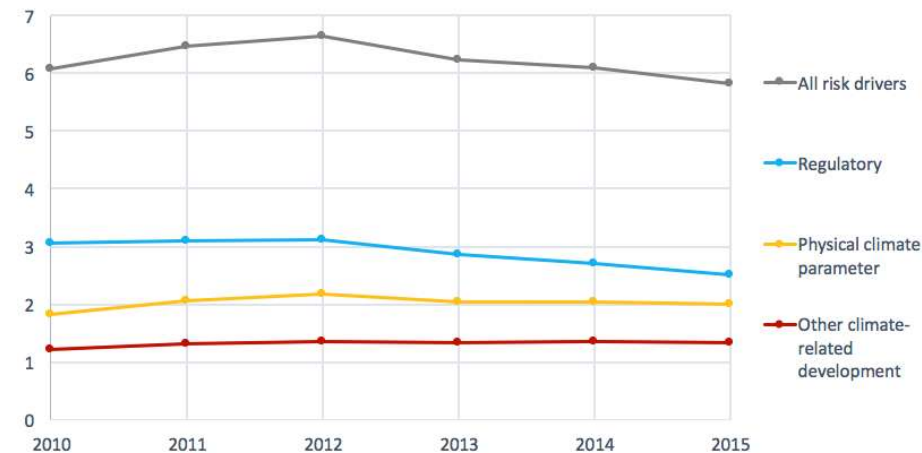
Emission Intensity Averages



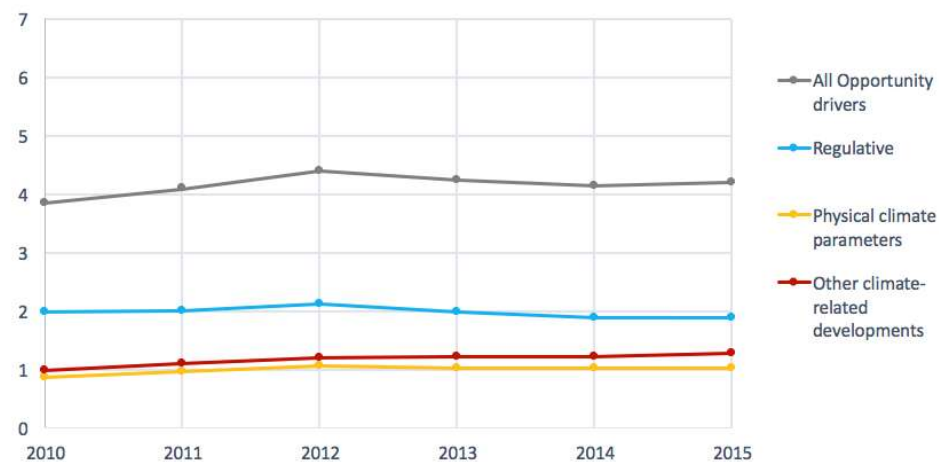
DESCRIPTIVE DATA

- Drivers identical (exceptions)
- Regulative e.g.
 - Cap and trade schemes, carbon tax, emission reporting obligations, renewable energy regulations, uncertainty surrounding new regulation, lack of regulation
- Physical e.g.
 - Change in mean temperature, change in temperature extremes, change in precipitation extremes and droughts, snow and ice, sea level rise, tropical cyclones, induced changes in natural resources
- Other e.g.
 - Reputation, changing consumer behavior, increasing humanitarian demands, uncertainty in market signals, uncertainty in social drivers

Risk Drivers Development Averages



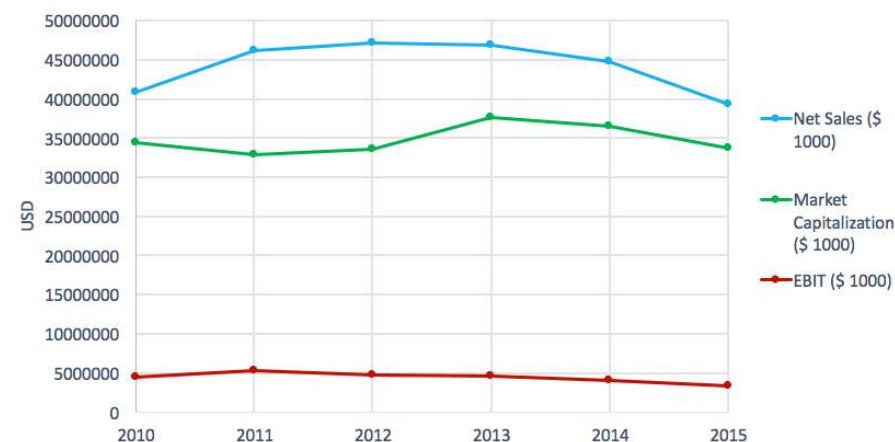
Opportunity Drivers Development Averages



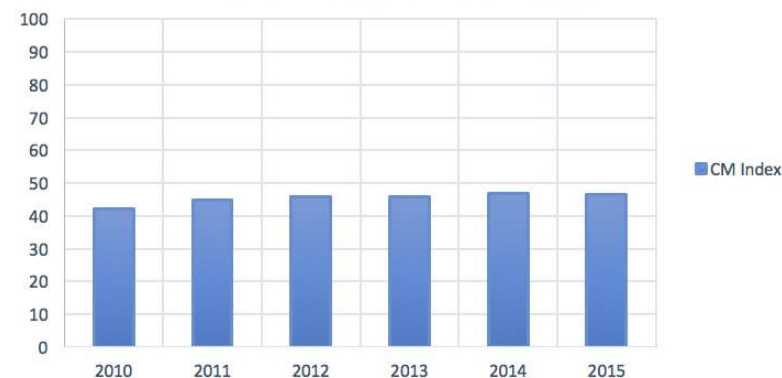
DESCRIPTIVE DATA

- Financials used in the research
 - Size, profitability, liquidity and solvency (debt ratios)
- Carbon Management Index
 - Direct Influence to emission performance
 - Targets, goods/services low-carbon, participate to ETS, project based carbon credits, initiatives, and methods to drive investments
 - Indirect influence to emission performance
 - Incentives for management of climate change issues (for whom), emission verification
 - Risk management
 - Climate change risk management, engage in activities to influence policies, identification of climate change risks and opportunities
 - Promotional/branding
 - Participate to CDP, highest level of responsibility, and integrated to business strategy

Financial data - Averages



Carbon Management Index Averages



RESULTS - DRIVERS AND BARRIERS IN INSTITUTIONAL CHANGE TO CARBON MANAGEMENT

- Financial performance not connected to improved emission performance
 - Carbon management seems to be expensive, internal costs do not decrease
 - Economic perspective missing, trade-off between environmental performance
 - Barrier
- Regulations are not the strongest influencers within institutional change to carbon management
 - Reluctance against such was discovered (decreasing)
 - Lobbying business as usual?
 - Drivers; Cap and trade schemes, emission reporting obligations
 - Barriers; renewable energy regulations, lack of regulation, uncertainty in the political environment
- Market conditions do not create pressures towards change (increasing slightly)
 - Barrier if markets do not reward carbon management actions, also reluctance discovered
- Physical changes due to climate change drive companies towards carbon management (increasing)
 - Strongest driver, trends support
- Direction “clear” but inefficient, hinders institutional change to carbon management
- Conflict in the mechanism between changed preferences to mitigate climate change and changes in relative prices



RESULTS - INSTITUTIONAL DIFFUSION OF CARBON MANAGEMENT

- Forerunners demonstrate isomorphic level in carbon management
 - Carbon Management Index results highly similar (countries & sectors)
 - Companies carbon management actions and methods very similar
 - Indicates wide and deep institutional level diffusion
- Concrete results in decreasing emissions not achieved
- Forerunner companies decouple carbon management actions from structure
 - Eventual results do not correspond these stated actions
 - Exceptions in both end, e.g.
 - General motors (CM Index ~74), and SSE plc (CM Index ~60)
 - Alliant energy corporation (CM Index ~23), and ThyssenKrupp AG (CM Index ~37)
 - In addition, larger size linked to higher CM Index (publicity)
- Carbon management not linked to companies maximization objectives, the increasing returns
 - Main reason for such results
- At present carbon management actions made to comply with societies changed preferences to mitigate climate change
- Lock-in to technological business as usual

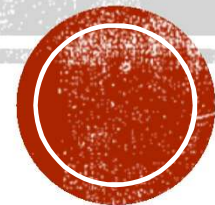


IMPLICATIONS

- Reaching 2050 targets of low-carbon economy does not seem positive due to results of the forerunners (innovative adopters) in carbon management
 - State of the followers is a concern
 - Institutional change to carbon management and thus reaching 2050 targets dependent on followers
- Policy implications
 - Strong (and stable) policy framework around carbon management
 - Put price for carbon
 - Economic incentives and penalties for engaging in carbon management
 - Significant prices e.g. high taxes for releasing emissions
 - Tax reliefs to companies that progress in carbon management
- Next
 - Analyzing institutional investor interviews
 - New business arising from the energy markets and investing to renewable energy production, investment in mobility and cities, and carbon capture, storage and use.
 - Develop Carbon Management Index further



THANK YOU!



Questions & comments?

APPENDIX

Institutional change model

- 2 mechanisms initiate;
 - Changes in relative prices.
 - Changes in preferences (influences and can be influenced by changes in relative prices).
- These 2 mechanisms create 3 types of pressures;
 - Functional; originate generally from changes in relative prices.
 - Political; originate commonly from changes in preferences or relative prices.
 - Social; derive largely from changes in preferences.
- The direction of change is influenced by 2 components.
 - Increasing returns.
 - Imperfect markets with related transaction costs.



APPENDIX

Institutional diffusion model

- 3 mechanisms that create 3 pressures;
 - Increasing returns; can prompt all of the 3 pressures.
 - Comes from the environment and is the most common result of traditional diffusion.
 - Linked to changes in relative prices but can influence the preferences.
 - Increasing commitments; instigates normative and coercive pressures.
 - Comes from normative basis.
 - Linked to changes in preferences.
 - Increasing objectification; instigates mimetic and coercive pressures.
 - Comes from culturally-cognitive basis.
 - Linked to changes in preferences.



APPENDIX

	<i>Regulative</i>	<i>Normative</i>	<i>Cultural-Cognitive</i>
<i>Basis of compliance</i>	Expedience	Social obligation	Taken-for-grantedness Shared understanding
<i>Basis of order</i>	Regulative rules	Binding expectations	Constitutive schema
<i>Mechanisms</i>	Coercive	Normative	Mimetic
<i>Logic</i>	Instrumentality	Appropriateness	Orthodoxy
<i>Indicators</i>	Rules Laws Sanctions	Certification Accreditation	Common beliefs Shared logics of action Isomorphism
<i>Affect</i>	Fear Guilt/ Innocence	Shame/Honor	Certainty/Confusion
<i>Basis of legitimacy</i>	Legally sanctioned	Morally governed	Comprehensible Recognizable Culturally supported

