Climate Change and the Adaptation Planning of Inland Port and Rail Infrastructures in the Province of Manitoba in Canada

—Tianni Wang, Spenser Samsom, Dr. Adolf K.Y. Ng, Dr. Paul Earl

Presented by Tianni Wang
Dept. of Supply Chain Management, University of Manitoba
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The Province of Manitoba in Canada

- Centre of North America & important transportation system
- General climate tendency: warmer and wetter winters, together with longer, drier and hotter summers (Kyoto and Beyond, 2001)
- Uncertain prediction: dramatic and frequent climate change (e.g., flooding and melting permafrost) and extreme weather (e.g., storms, tornadoes and hurricanes)
Introduction

The Port Supply Chain—CentrePort Canada & the Hudson Bay Railway

- **Risks** (flooding) and **uncertainties** (the extreme weather events) on CentrePort
- **A double-edged sword**: threats (e.g., melting permafrost) and opportunities (e.g., longer shipping season) on Hudson Bay Railway
- **Strategic Adaptation planning** for climate change is necessary and significant
Qualitative Research Method

- **Two in-depth case studies** on CentrePort (an inland terminal) and the Hudson Bay Railway
- **Seven semi-structured, in-depth interviews:** five face-to-face and two telephone interviews
- **A within-case analysis and cross-case analysis** (Miles and Huberman, 1984; Yin, 2003)
- **A diverse data source:** interview data and archival data for triangulation
The potential impacts of climate change in Manitoba

(Source: Government of Manitoba, 2014 maps.com)
Risk—flooding in Manitoba (1800s, 1950, 1997, 2009 and 2011)

- Highway 75 closure, SC disruption
- **Manitoba government** placed huge investment in flood control, e.g., Red River Floodway (Manitoba government website, 2013)
- **Forecasting** (e.g., by Hydrological Forecast Centre) and **strong emergency management system** (EMO and MIT)
- **Dilemmas** include predicting difficulties, long-term returns
CentrePort Canada

- Uncertainties
  - More extreme events impact port operation (e.g., tornadoes, heavy storms, extreme cold events) (Manitoba Government website, 2014)
  - Variable ecological condition increases the severity of flooding risks
  - Significantly less snow cover affects port’s business
  - Indirect impacts from other jurisdictions in the SC
CentrePort Canada

Current plans

- **Tomorrow now**: Manitoba’s green plan
- CentrePort and government: **No specific adaptation plans for climate change**

Adaptation planning

- **Necessary**: meet demand of port’s five-year plan & sustainable development of whole society
- **Good resources**: funding and infra assistances from government and cooperating entities, academic research and discussions
Climate change: A double-edged sword

- **Opportunities**: longer shipping seasons and access to previously impassable waterways (Northwest Passage) (Bello, 2014)—hard to achieve due to insurance restrictions

- **Challenges**: permanently frozen peatland becomes unstable and permafrost becomes active with temperature rise (Weather Underground, 2014)
Hudson Bay Railway

Resulting Impacts

- **Unstable railway**: Recent derailments caused supply chain interruptions and delayed shipments to Northern communities.
- **Unreliable railway**: Slower travel speed is required due to uneven and heaving track.
Hudson Bay Railway

Current plans

- OmniTRAX and Provincial and Federal Governments: **invested** $110 million and $40 million in recent track upgrades

- OmniTRAX and the Churchill Gateway Development Corp: **no formal adaptation plans for climate change**

Adaptation plan—two basic solutions

- Remove the peatland that makes up the layer of permafrost—expensive & impractical

- **Lift the track and laying an insulating bed of gravel** (Bello, 2014)—might reduce negative impacts
Discussion and Recommendation

Common Issues

• Most pressing issue: **financial constraint** (a negotiation between the public and private sector on who pays for reducing risks in what percentage)

• **Lacking institutional guidelines**

• How could high-level **knowledge** be downscaled into corporate plans and businesses?

• How to reduce the **trade-offs** among different stakeholders and maximize benefits of them?

• How to achieve high **public participation**?
Recommendation: a five-part approach

- Increasing **awareness** and understanding of the impacts of climate change & making **specific guidelines**
- Promoting **transparency and openness** in sharing information
- **Balancing and prioritizing** the trade-offs in SC
- **Drawing adaptation plans of similar inland ports**
- Realizing **all-parties’ involvement** in decision-making process
Conclusion

Climate change impacts and adaptation in Manitoba—two in-depth case studies

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Adaptation planning for climate change

| CentrePort Canada: necessary with good resources |
| Hudson Bay Railway: lifting the track and laying an insulting bed of gravel |

Common issues: finance, guidelines, knowledge, trade-offs, public participation

Recommendation: a five-part approach
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