

Understanding Concerns of Using Algorithmic Decision Making (ADM) Systems

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Algorithmic Decision Making (ADM)

- ADM systems employ algorithms (e.g., machine learning, artificial intelligence) on personal data
 - Data collected through online activities, sensors, etc.
 - They take automated decisions or give suggestions
- ADM systems are heavily used by businesses, governments, and the non-profit sector
- They have become a vital part of our everyday lives
 - Improve efficiency of our lives, increase reliability of services, enable new services

ADM Challenges



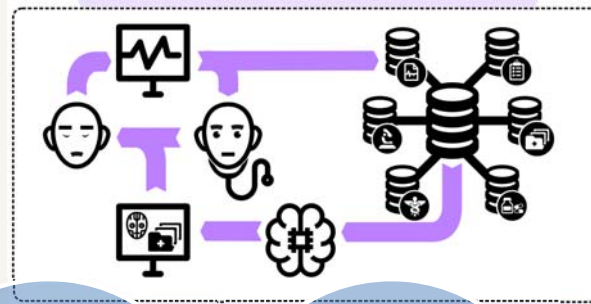
- They have a complex and opaque nature, often referred to as “black-box”
- It is difficult for their users
 - to understand how they exactly work
 - to judge if they respect fundamental human rights such as fairness and privacy
- Their nature causes users to develop concerns and have issues in building trust to these systems (or the organizations providing them)

ADM and GDPR

- Challenges of ADM are acknowledged by EU through articles 13-15 of GDPR
 - every individual has a right to be informed of
 - 1) the logic involved in the decision-making process and
 - 2) the potential consequences of the processing
- GDPR hardly provides any guidance
- The users' perception of concerns and benefits of ADM systems are not investigated
- It is not clear how explanations can be used to overcome those concerns and enable users to build trust with the systems
- The challenges call for research to understand the perception of users on ADM systems

ADM System Concerns

Medical Treatment with Artificial Intelligence



Who is responsible if the treatment causes a damage?

Will I (or my doctor) be able to understand the rationale of the decision?

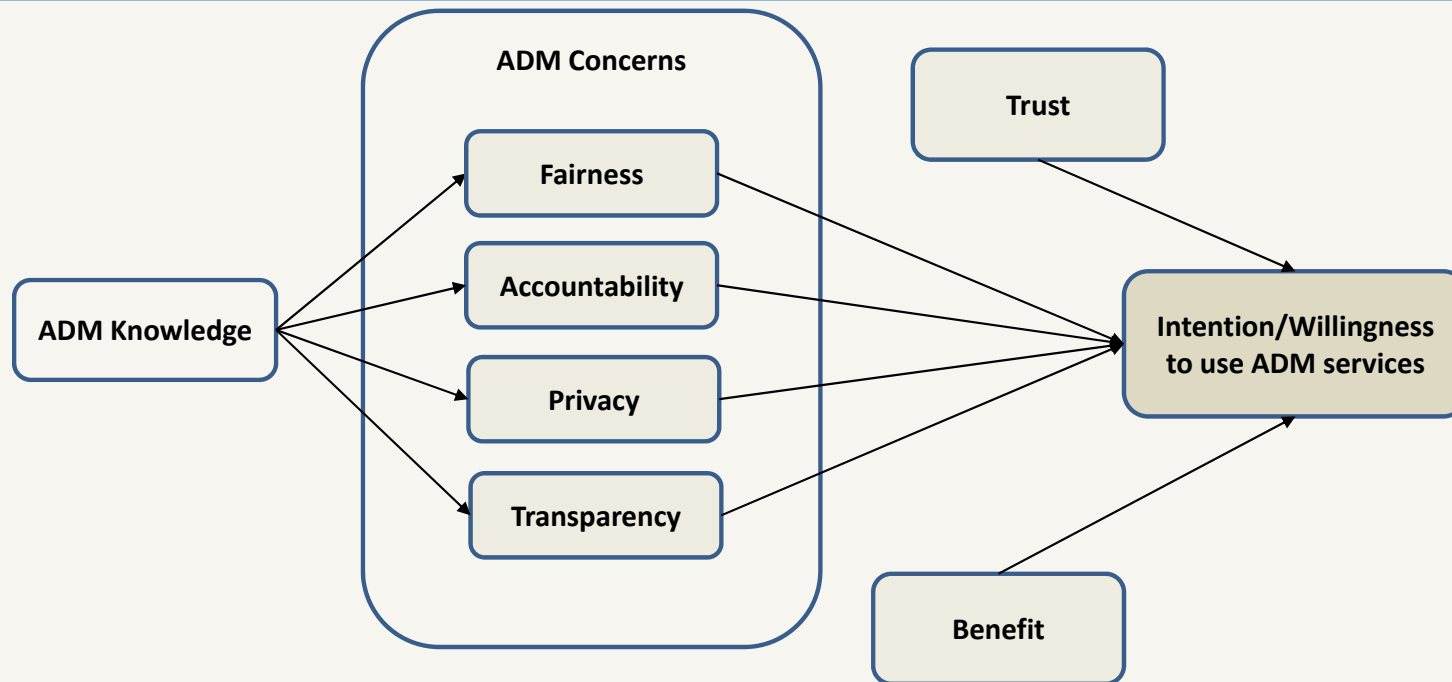


Will my data be shared with some other organization?

Does the system give fair decisions for me?



Research Model



Tax authority

Insurance

Social media

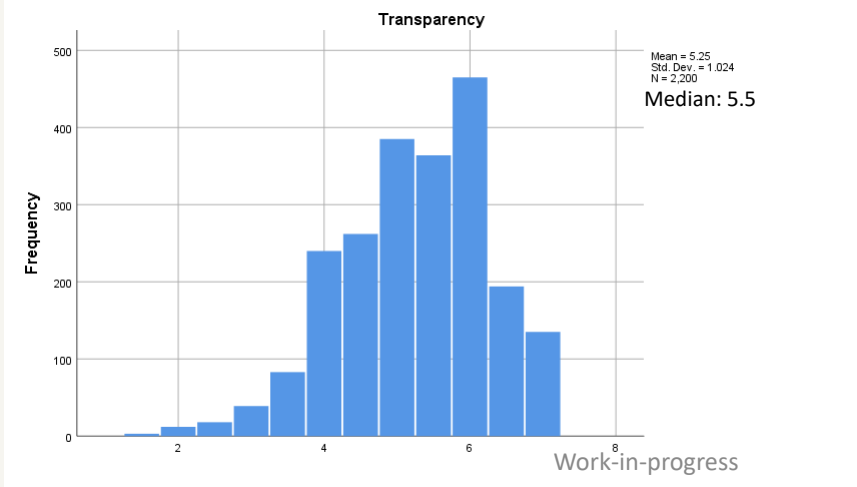
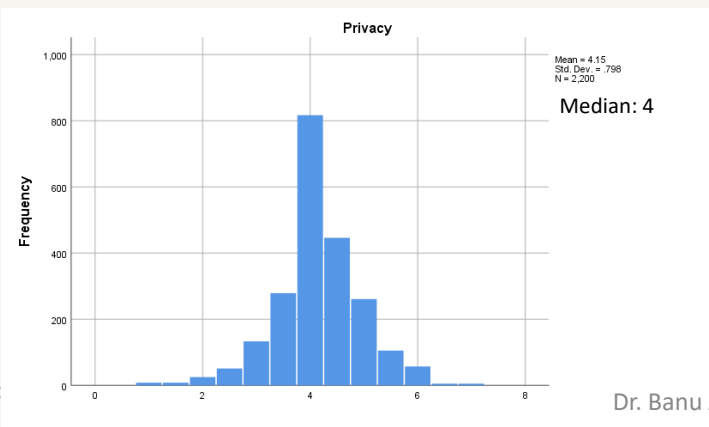
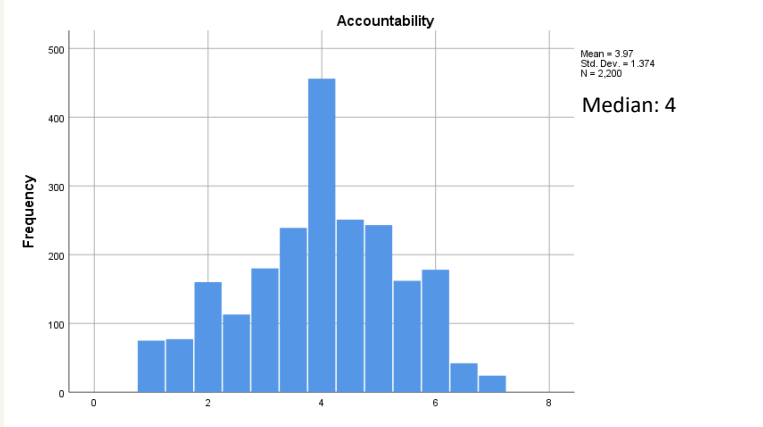
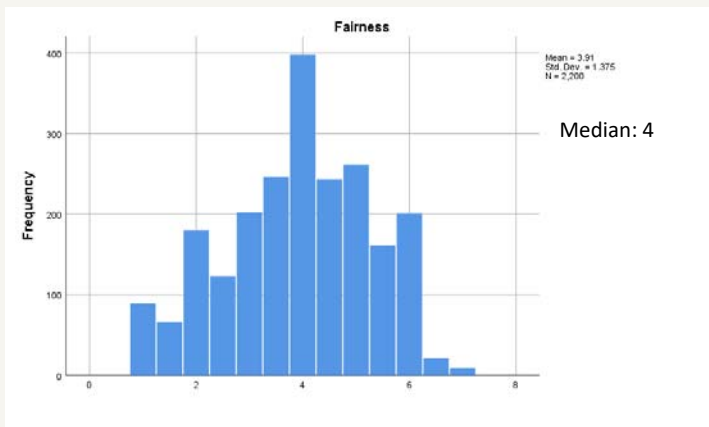
Medical care

Employment

Survey and Data Collection

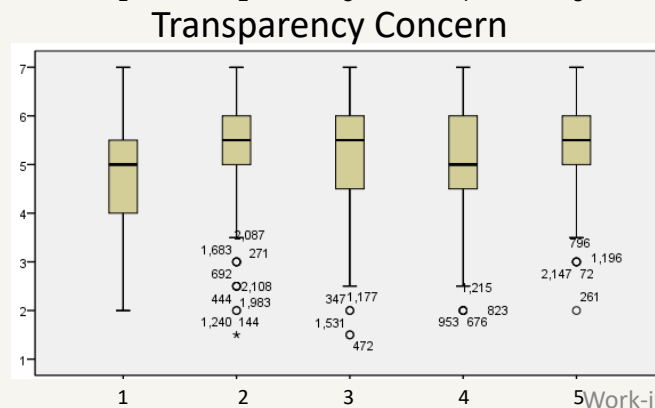
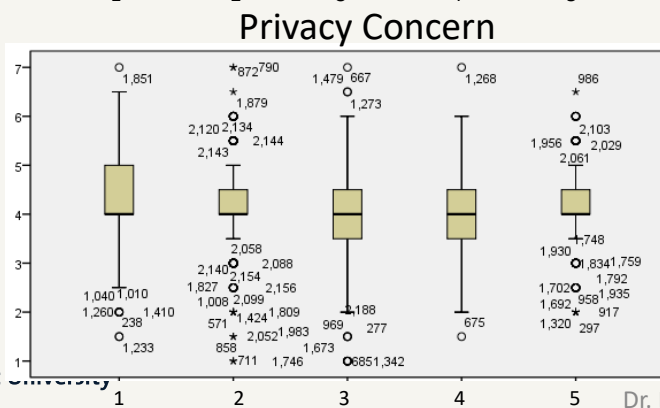
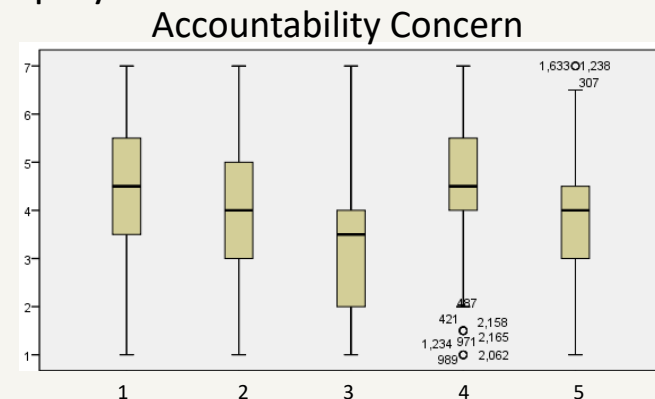
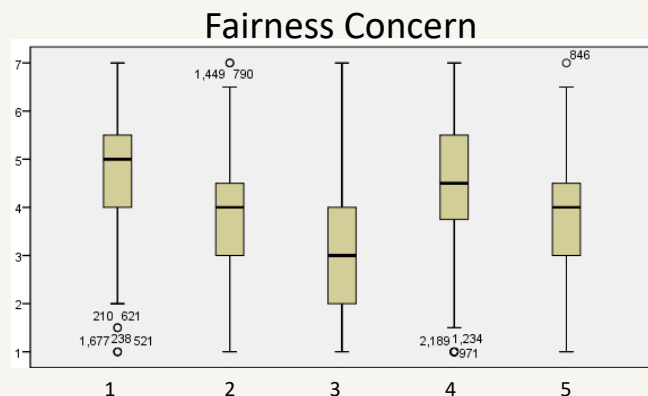
- 5 different scenarios are prepared to test the model for ADM systems of different nature
 - 1: Tax Authority 2: Insurance 3: Social Media, 4: Medical Care 5: Employment
- 2 items per each variable. E.g. trust questions
 - I trust that this system would provide high-quality decisions about me.
 - I believe that this system would not intentionally harm me.
- Survey presented in 3 pages
 - Introduction to ADM system and the scenario
 - Two sets of questions for each variable in random order
- 2700 data points collected
- Data cleaning
 - Careless answers, fast answers, model fit and prediction outliers removed.
- Balanced data set and good experience with answering questions

Descriptives for Concerns

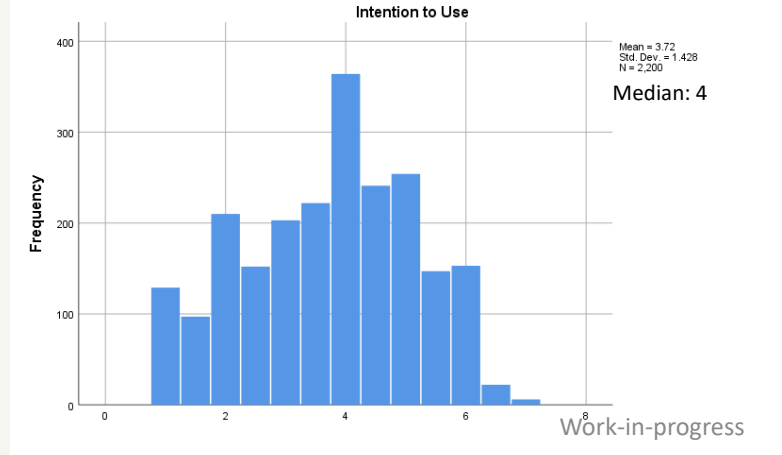
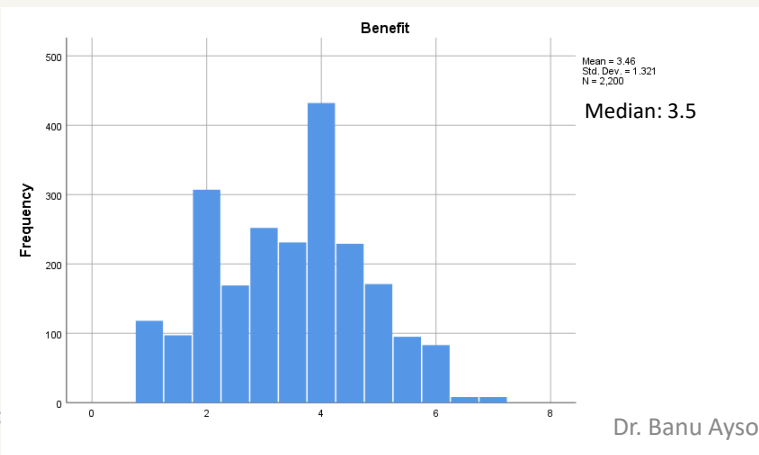
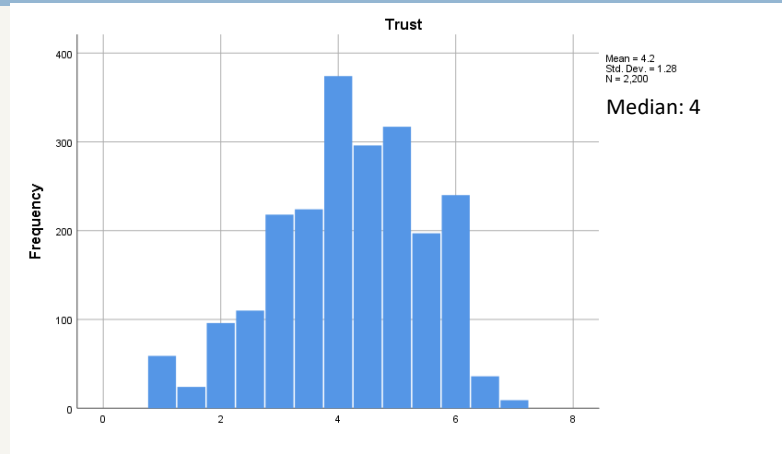
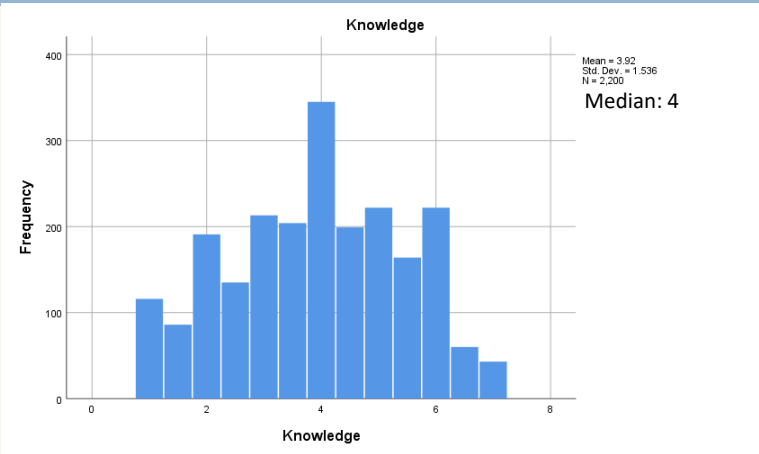


Change of Concerns within Scenarios

1: Tax Authority 2: Insurance 3: Social Media
4: Medical Care 5: Employment



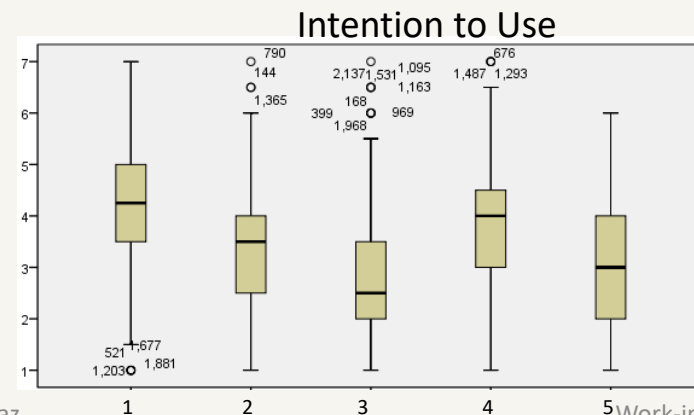
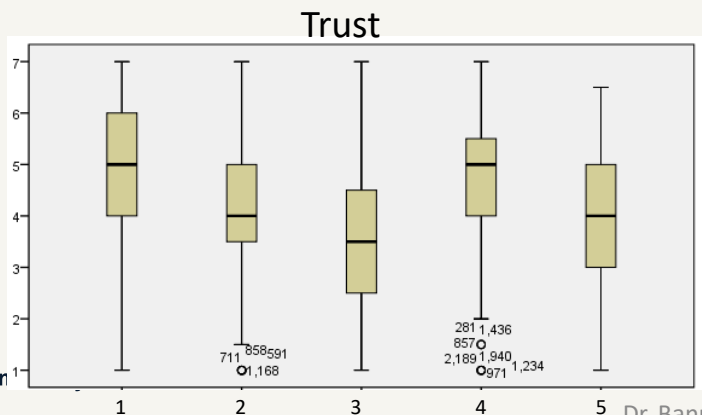
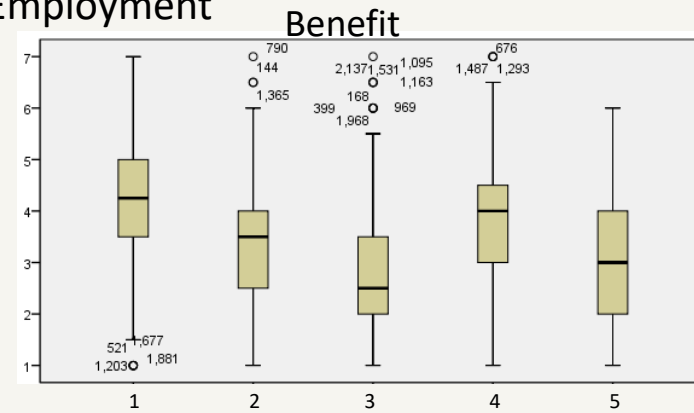
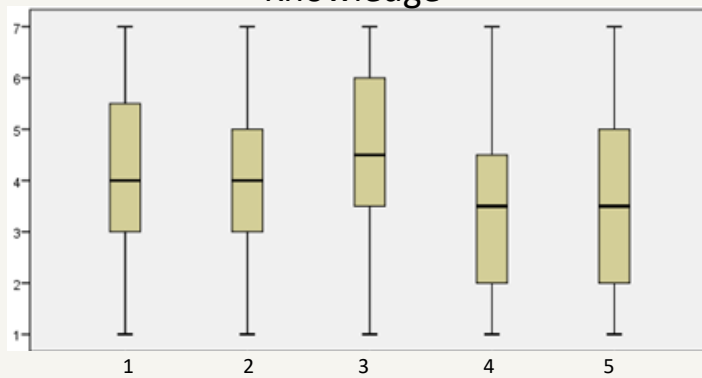
Descriptives for Model Variables



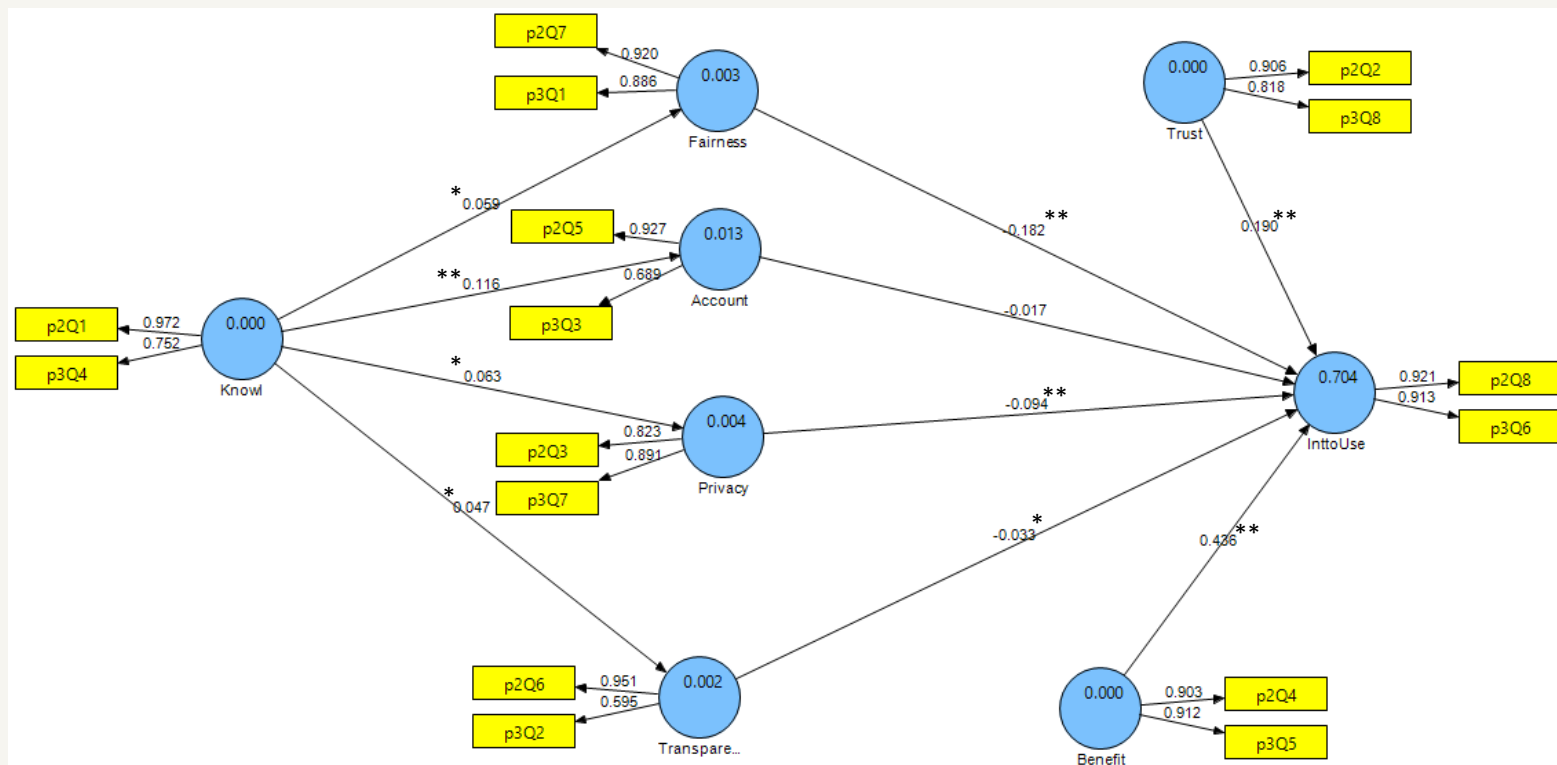
Change of Other Variables within Scenarios

1: Tax Authority 2: Insurance 3: Social Media

4: Medical Care 5: Employment



Overall Results



Findings

- The more the knowledge of a person regarding an ADM system, the more the concerns
 - In line with information privacy research
- Fairness, Transparency, and Privacy are valid concerns about the intention to use ADM systems
 - Accountability is not significantly related
 - Path coefficients are low but significant
- Trust is an important factor to use an ADM system
- Benefit seems to be the most important factor
- The model has a high overall R^2 of 0.704

Interpretation of Different Scenarios

- Different ADM systems are not known that well.
 - Obviously, it was much easier to answer social media questions, shown by high indicator loadings
 - More awareness of these systems needed
- Knowledge hardly relates to concerns
- Accountability is possibly not understood well
- Concerns are different for different types of systems
- Perceived trust is always important for intention to use
- Perceived benefit of a system is the most important factor to use a system

Future Steps

- More detailed analysis on the data set
- Perform more detailed studies for different ADM systems
- Develop and design experiments to understand
 - How explanations can overcome concerns, provide better understanding of benefits and improve trust
 - How most helpful explanations can be designed



How LISS empowered us

- ADM systems are offered to any member of society
 - LISS enabled us to reach a wide sample of general population
- A second pair of eyes to ensure the quality of the survey design
- No burden to distribute the survey and manage the technical infrastructure

What else could be helpful:

- A pilot run with a small sample
- Flexibility in the design of the survey during submission

Thank you for listening.

Questions?



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