ALGORITHMICALLY VULNERABLE CONSUMERS: REDEFINING VULNERABILITY IN ACCESSING HEALTH SERVICES IN CHINA

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Algorithmically vulnerable consumers: Redefining vulnerability in accessing health services in China

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Why is it important for policy makers and regulators?

• Who are vulnerable customers defined by algorithm?
• What factors cause consumers’ vulnerability?
• What are implications for future policy of consumer protection?
What is *algorithmically vulnerable consumer*? And why now?

- Technologies such as AI have started to change our understanding of ‘consumers’ and ‘vulnerable consumers’
- COVID provides a timely opportunity to extend the scope of accessible ‘public utility’
- An example to illustrate algorithmic consumers: eHealth in China
## Introducing new risks of vulnerability among consumers

<table>
<thead>
<tr>
<th>Factors</th>
<th>Features of vulnerability</th>
<th>Impact on policy making and regulatory implementation</th>
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</thead>
<tbody>
<tr>
<td>Biological factors (e.g. disability) (Cartwright 2015)</td>
<td>• Unable to control to unfair treatment</td>
<td>Currently available policies often target specific groups of consumers</td>
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<tr>
<td>Psychological factors (e.g. mental health) (Stephens, et al., 1994; Brennan)</td>
<td>• Unable to control to unfair treatment&lt;br&gt;• Unable to choose or access (EC, 2016) products/services&lt;br&gt;• Incapable to maximise his/her well-being (EC, 2016)</td>
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<td>Socio-demographic factors (e.g. gender, race, education, financial situation) (FCA, 2019, 2020)</td>
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<td>Resilience (awareness, skills of self-management, capacity to seek redress) (Baker, et al., 2005)</td>
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<tr>
<td>Algorithmic bias (Gal &amp; Elkin-Koren, 2016; Whittaker, et al., 2019)</td>
<td>• Unable to control to unfair treatment&lt;br&gt;• Less autonomy&lt;br&gt;• Unfairly represented&lt;br&gt;• Likely discriminated</td>
<td>The increasing risks of marginalising certain groups of consumers</td>
</tr>
</tbody>
</table>
Algorithmically vulnerable consumers

are those who are harmed or receive unfair treatment due to mis-designed machine learning algorithms and/or biased large-scale data, i.e. input data for machine learning that is not representative of consumers in our real society, which in turn causes algorithms to develop a systematic bias towards certain groups that is not obvious from the algorithm's description itself.
The QR code inside the Alipay app. Green is good, and allows the holder to travel freely. Credit:Raymond Zhong/The New York Times
Appointment booking & telehealth

- Search by hospital, physician, specialty, and condition.

- Pre-Visit Consultation, starting at $1.5.

Personal health records management

- Pay for ambulatory visits
- Check health records
- Service records
Consumers-facing knowledge platform

Group-buying healthcare products & services
New models for Chinese consumers to access health resources

- Knowledge bank
- Life-long coaching and education
- Health management
- Chronic disease management
- Online appointment
- Online and offline consultation
- Personal health record management
- Algorithmic consumers
- Insurance
- medicine purchase
- Other Social activities (e.g., gamifying aesthetic medicine)
Features of eHealth evolution in China

1. Treatment
   - Traditional hospital: non-digitalized archives and records
   - Hospital-oriented treatment supply

2. Health management
   - Consumer-oriented Self-management
   - eHealth: data-driven, personalized, and proactive health management
Categorization of data collected from consumers and used for training data

- Attribution data
- Expression data
- Relational data
- Behavioral data
- Payment data
- Context data
- Registration data
- Profiling data
- Biometrical data
- Attitude data that indicates what users believe and expresses their thoughts
- Scenario data
- Trend data

(Xue, 2016, adapted from the work of Edwards, and Leimbach, et.al.)

- Meta data
- Interactional data
- Behaviors, sports and health
- Card info
- Transaction data
Algorithmically vulnerable consumers

- Aged above 60, without smartphones, unable to use online booking and telehealth
- Aged between 25-30, pregnant, domestic violence, passive on online social platforms
- Aged between 45-55, Type 2 diabetes, using several apps for daily management
Policy implement and future implications: Reflections on Chinese experience

**Awareness**
- Increase local regulatory authorities’ awareness of long-term social impact
- Guidelines for algorithm developers and operators with providing examples of fairly designs
- Guidelines to increase consumers’ knowledge of vulnerability caused by algorithm

**Regulatory effectiveness**
- Policy incentives to encourage the service providers with fairly designed algorithm
- Policy incentives to encourage technology-enabled protection mechanisms for consumers
THANK YOU!