The impact of the PANACEA project

Davide Shingo Usami and Jenny Carson

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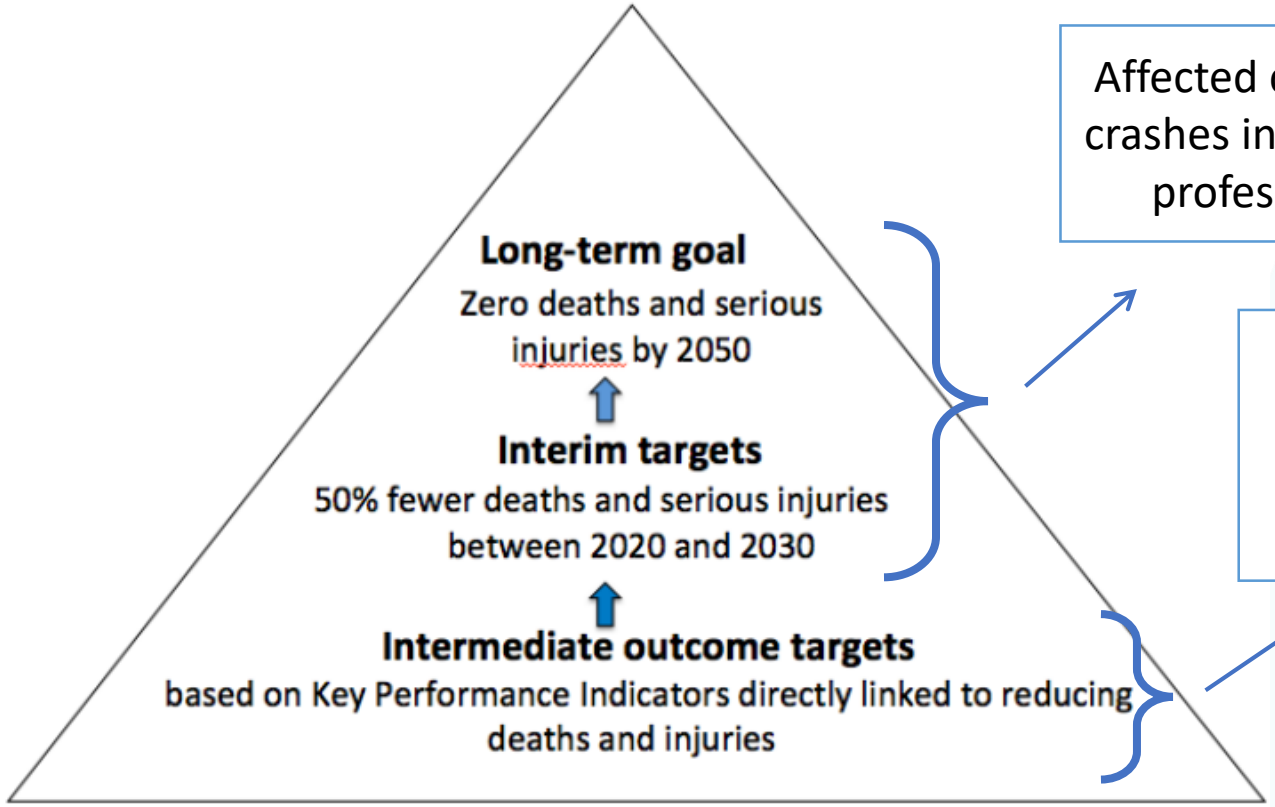
PANACEA Final Event
10 September, 2024

How PANACEA contributes to EU targets

Safe System results hierarchy at EU level



Affected crashes/injuries: crashes involving impaired professional drivers

How many impaired behaviour related crashes/injuries avoided?

Affected EU KPIs: Alcohol, Distraction + Fatigue, Drug

How many impaired behaviour events avoided?

+ Transferability of project solutions to other transport modes

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Impact assessment methodology

Modelling **the behaviour of commercial drivers**

Estimating **the number of impaired behaviour events**

Modelling **the effects of PANACEA solution**

- Behaviour data from ESRA international survey

ESRA
E-Survey of Road users' Attitudes

- Transportation companies survey
- External database to estimate number and characteristics of commercial drivers in a country

- Solutions Acceptance level
- Detection Accuracy
- Countermeasure effectiveness
- QoL questionnaire

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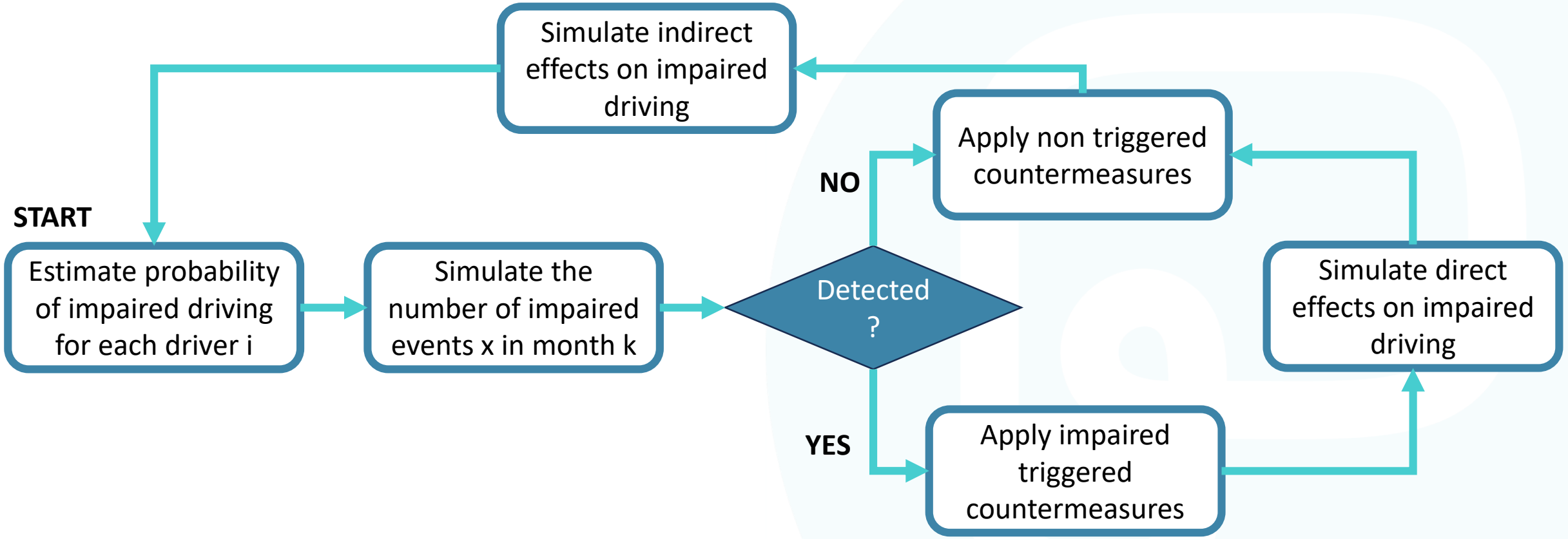
Impact assessment tool

For each month, in a given company…



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Indicative results

- **Personal characteristics**
  - Being **female** → Decrease impaired driving probability.
  - Increasing the number of **shifts/week** → Decrease impaired driving probability.
  - Higher **age** → Decrease impaired driving probability.
  - **Acceptance (tolerance)** of impaired behaviour → Highly increase impaired driving probability.
- **Country level characteristics**
  - Standard BAC limits → taxi, professional car drivers
  - Self-reported use of prescribed medicines → bus, truck drivers
  - Prevalence illicit drugs & Prevalence of drug use → truck, professional car drivers

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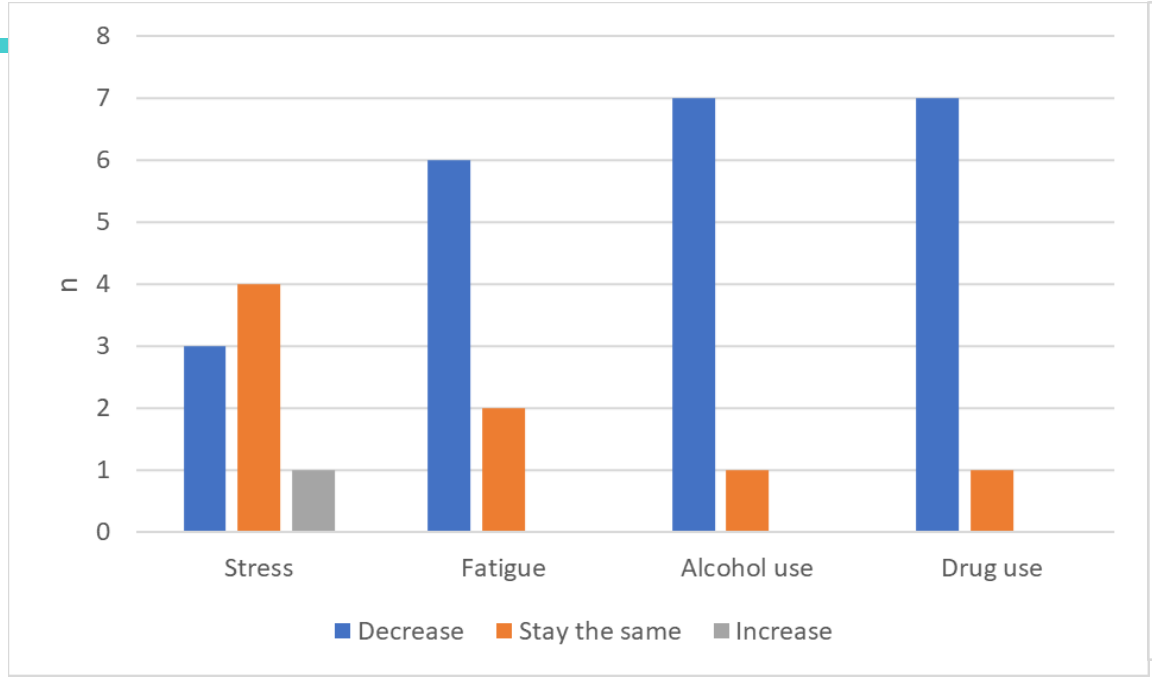
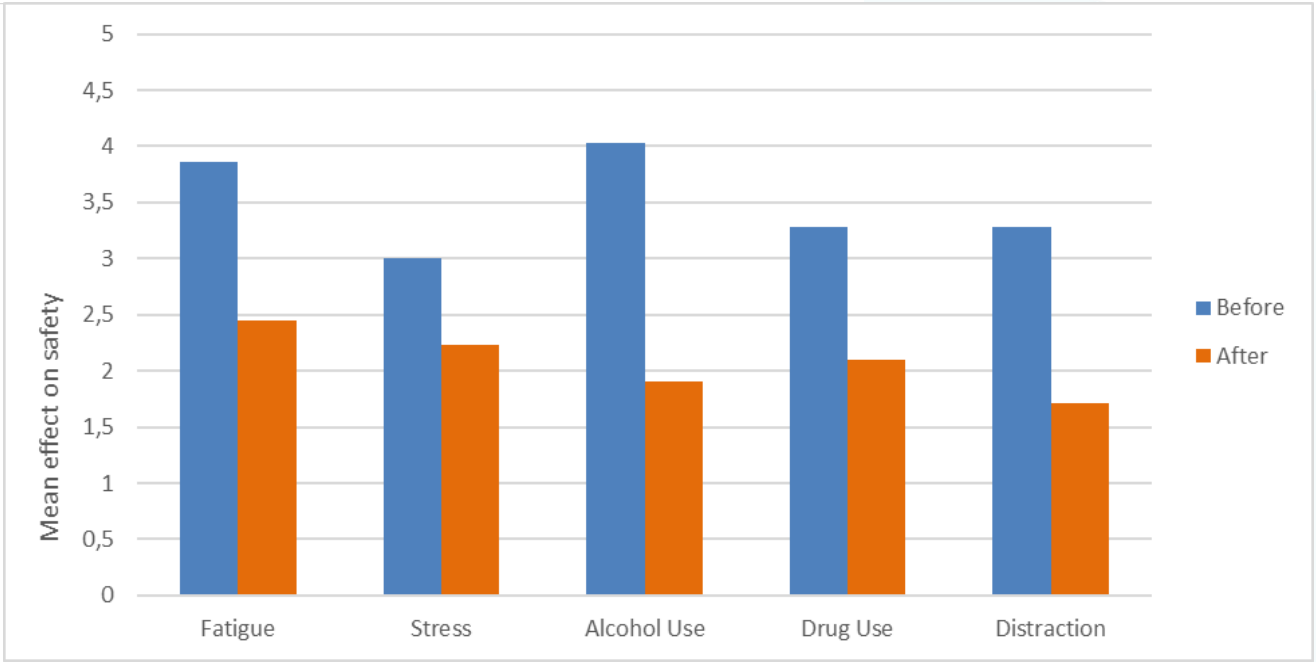
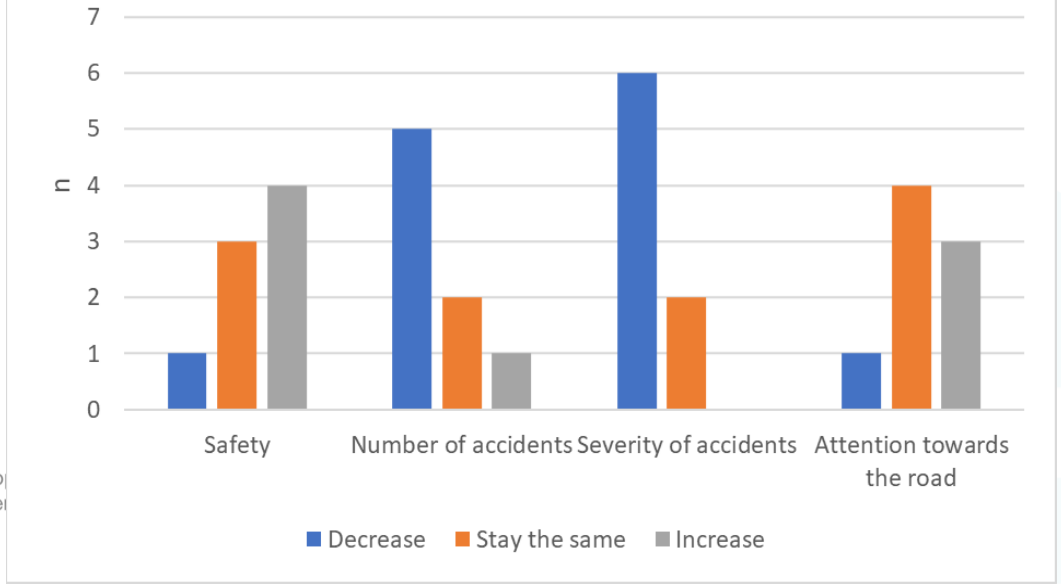
Indicative results







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Transferability to other transportation areas

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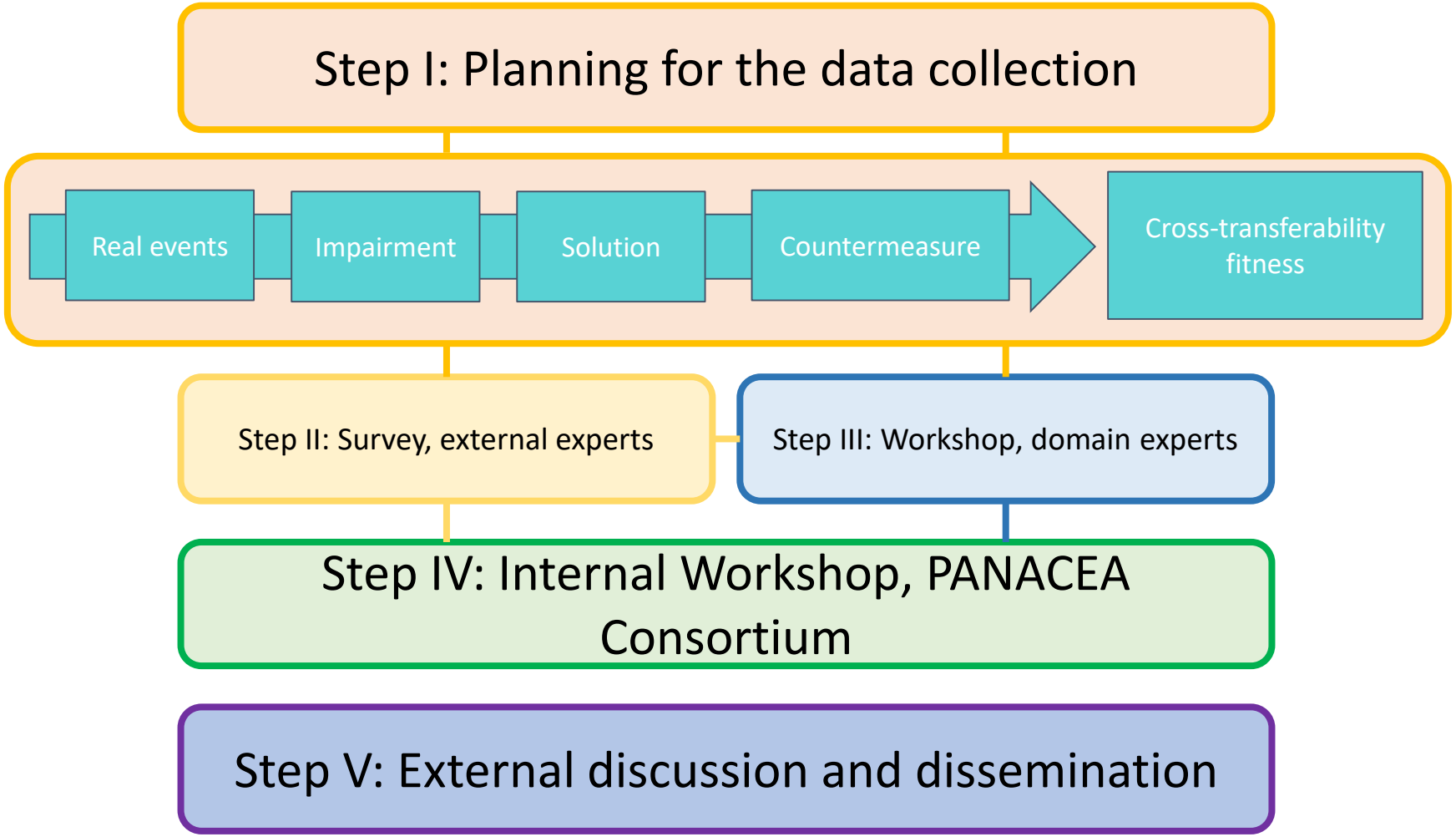
Cross-modal transferability impact assessment and exploitation

OBJ: assess the cross-modal transferability of the PANACEA solutions, ensuring that the outputs of the project are beneficial also in other transport modes.



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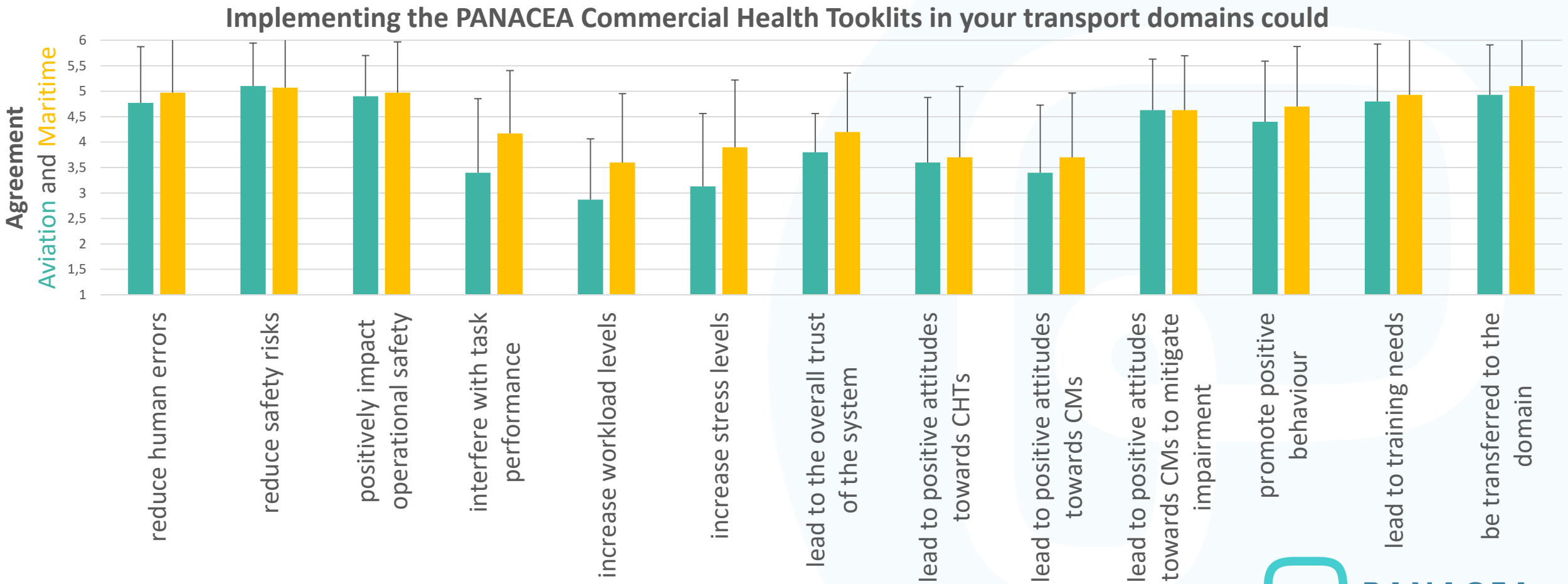
Survey – External experts

Cross-model transferability impact to Aviation and Maritime sectors (**60 respondents)**



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Workshop with Domain Experts - Results

Transferability to:	Aviation	Maritime
Availability	• Regulations • Procedures • Tools (fatigue, vigilance, stress)	• Regulations • Procedures
Applicability challenges	1. Concerns regarding privacy, **data management (GDPR)**, and cybersecurity. 2. Pilots' acceptance and unions' acceptability **3. Inapplicability of countermeasures** to operations and shifts. 4. Cost of the sensors	1. User acceptance 2. Connectivity infrastructure 3. Concerns regarding privacy, **data management (GDPR)**. **4. Inapplicability of countermeasures** to operations and shifts.
Applicability recommendations	1. Introduce safety and just culture 2. Provide a strong security system 3. Define roles and responsibilities over the tool and data 4. Tailor each CHT tool to personal differences	1. Introduce Safety and Just culture 2. Offline system functioning 3. Ensure integrity of the data collected 4. Apply toolkit to freight maritime rather than commercial maritime
Expected impact	• Improved safety (pilots, passengers, and aviation system) • Improved awareness and wellbeing of pilots. • Improved shift planning effectiveness. • Data to reinforce decision making at company and regulatory level	• **Improved safety (maritime system)** • Improved job quality (wellbeing) • Reduction of human incidents and accidents

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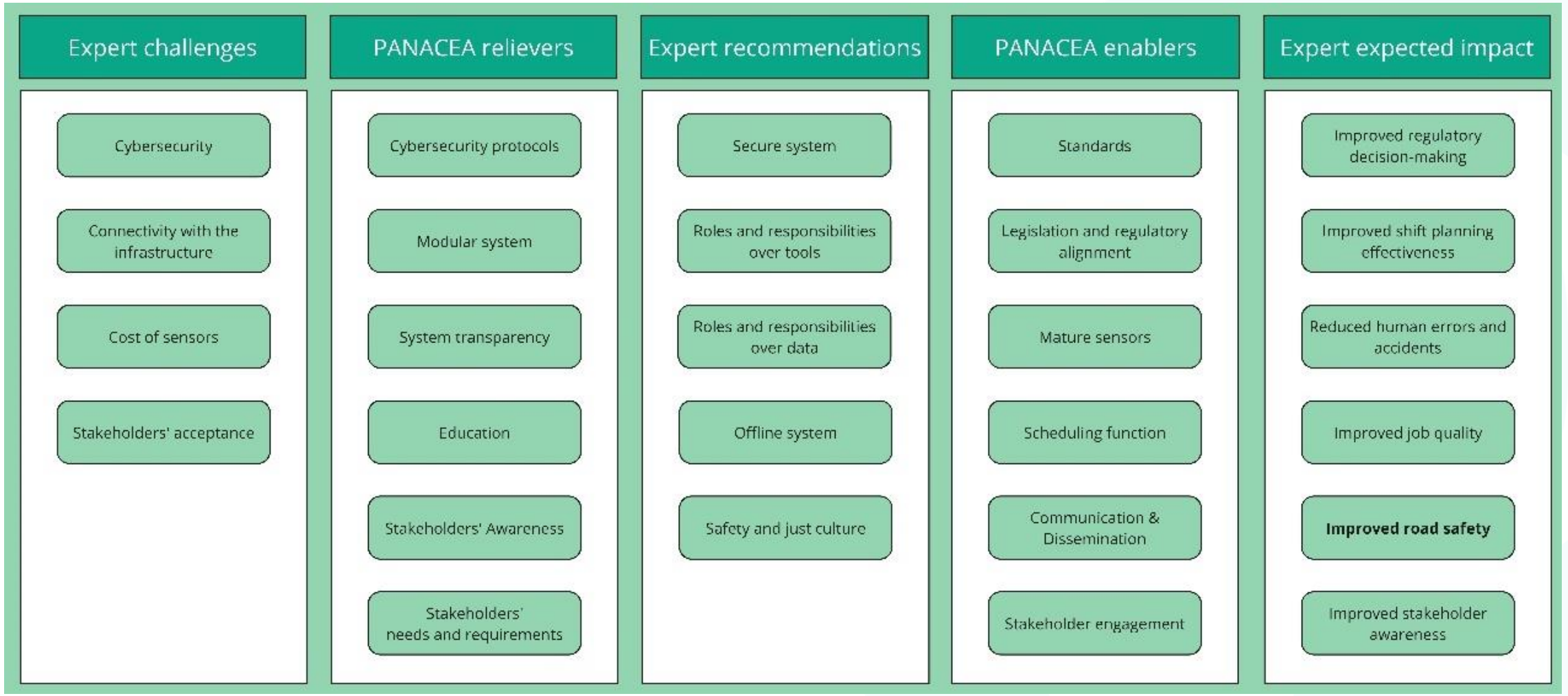
Internal PANACEA Workshop - Results



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Conclusions

Impact assessment

- Indicative results highlighted how PANACEA aligns with and supports EU safety and operational goals.
- Simulations provides further insight on the effect of PANACEA solution on road safety.

Transferability

- Positive perception and high scores in safety impact, trust, and transferability from external experts.
- Identified challenges and recommendations for implementing tools to manage fatigue, stress, and vigilance in aviation.

Standardisation & Exploitation

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Suggestions for Standardization Extensions

- **ISO 26262 (Functional Safety)**
  - Integrated real-time biometric data (e.g., heart rate, fatigue) into vehicle safety systems.
  - Automated responses to biometric triggers indicating driver impairment.
- **ISO 39001 (Road Traffic Safety Management)**
  - Introduced a harmonised method of fitness to drive across impairments and states for better road safety management.
  - Developed real-time health monitoring protocols with immediate intervention mechanisms.
- **ISO 45001 (Occupational Health and Safety)**
  - Established continuous health monitoring, focusing on fatigue and stress detection.
  - Mandated regular health reviews with required rest periods based on data thresholds.

- **Autonomous Vehicles**
- Extended standards to address driver fitness in semi- and fully autonomous vehicles.
- Ensured driver monitoring system compatibility with ISO 24089*, including secure updates.
- **Safety and Regulatory Compliance**
- Enhanced alcohol and drug detection standards with real-time monitoring and automatic immobilization.
- Expanded ISO 45003** to mandate fatigue and stress monitoring for occupational safety

*Requirements and recommendations for software update engineering for road vehicles on both the organizational and the project level.
**ISO 45003: Guidelines for managing psychosocial risk within an occupational health and safety (OH&S) management system.

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Impact on standards: benefits

Regulatory and Compliance Advancements

- **Vision Zero Alignment:** Contributing to the Vision Zero initiative by integrating continuous driver monitoring, reducing road fatalities and enhancing overall traffic safety.
- **Mandatory Inclusion in Manufacturing:** Advocating for the mandatory inclusion of advanced driver monitoring systems in the manufacturing process of new commercial and professional vehicles, ensuring that safety standards are built-in from the start.

Industry Applications

- **Real-Time Driver Monitoring:** Deploying real-time biometric and monitoring technologies in commercial fleets to proactively prevent accidents and improve road safety.
- **Sector Adoption:** Extending these technologies across various sectors, including logistics, public transportation, and emergency services, ensuring consistent safety standards industry-wide.

Future Directions

- **Collaboration with Standardization Bodies** Collaboration with international standardisation bodies to further refine thes standards, ensuring global applicability and relevance.
- **Exploring Emerging Technologies:** Investigating potential standard extensions for emerging technologies like AI-based driver assistance and predictive analytics, aiming to future-proof driver monitoring and safety systems.

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Fitness to drive 2.0

- To our knowledge, there are no unified holistic driver unfitness management systems.
  - Instead, there are fatigue risk management systems, drug and alcohol withdrawal programs, and stress management systems.
- A Fitness-to-drive 2.0 consists of a combination of measurement systems, diagnosis systems, and countermeasure systems, as well as longer-term interventions and treatments.
- Fitness to drive 2.0 should have plug and play functionalities so old technologies can be replaced, and new technologies covering additional driver states can be embedded in the system.

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Fitness to drive 2.0

- Testing and evaluations needed:
  - Interface certification testing - all constituent systems can communicate with and within the Fitness-to-drive 2.0 system.
  - Constituent system developmental testing - validity of the constituent systems, including tests within the full Fitness-to-drive 2.0 environment.
  - Countermeasure testing - verify that the constituent countermeasures, and their resulting combined Fitness-to-drive 2.0 counterparts, are effective.
  - Organisation compliance testing
  - Simulation testing and in-situ testing

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Impact on policy and legislation

- Policy and legislation:
  - Recommendations for Mandatory Health Checks
    - Develop an effective and transparent screening protocol
  - Recommendations for Roadside Alcohol and Drug Testing
  - Recommendations for Improved Legislation and sanctions
    - Recommend maximum blood alcohol concentration (BAC) limit of 0.5g/l, lowered to 0.2g/l for novice and professional drivers
  - Recommendations for Standardized EU-wide Reporting System
    - Unified system for reporting traffic offenses and violations across EU
  - Recommendations for Fatigue Driving
    - Extend the legislative framework for working time and driving and resting hours to cover all professional light goods vehicle drivers, not just international transport
  - Recommendations for Technology
    - Mandate pre-driving electronic monitoring systems to prevent excessive fatigue and impairment driving among commercial drivers
    - Mandatory in-vehicle electronic monitoring systems to prevent fatigue and impairment driving among commercial drivers.

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Exploitation – Business Model Canvas

Key Partners

Sensor Makers: They provide the gadgets we use.

Fleet Operators: They test our system and give feedback.

Insurance Companies: They help us reach more customers.

Safety Regulators: They help us meet safety standards.

Key Activities

Research and Development: We keep improving our technology

Marketing and Sales: We attract new customers

Customer Support: We help our customers use Panacea effectively.

Compliance Management: We make sure Panacea meets all safety regulations.

Key Resources

Technology: Our smart gadgets and software platform.

Experts: Our team of engineers, data scientists, and health experts.

Partners: Our partnerships with sensor makers and research institutions.

Reputation: Our good name built through successful projects.

Value Proposition

Safety: Panacea helps drivers stay alert and safe by checking for tiredness, stress, alcohol, and drugs.

Health: It keeps drivers healthy by warning them before they get too tired or stressed.

Compliance: Helps companies follow safety rules easily.

Peace of Mind: Reduces accidents and makes roads safer for everyone.

Customer Relationships

Personal Support: We offer help and training for companies.

Self-Service: Drivers can use our app to check their health.

Community: We build an online community for drivers to share tips and support each other.

Feedback: We listen to our customers to make our system even better.

Channels

Direct Sales: We talk to companies directly.

Partnerships: We work with insurance companies and safety regulators.

Customer segments

Commercial fleet companies

Public transport companies

Insurance companies who want fewer accidents.

Policemen and safety regulators who want safer roads.

Cost Structure

Research and Development: Creating and improving our technology.
Operations: Running our platform and supporting our customers.
Marketing and Sales: Attracting and keeping customers.
Partnerships: Working with other companies and experts.

Revenue Streams

Subscriptions: Companies pay a monthly fee to use Panacea.
Licensing Fees: We let other companies use our technology for a fee.
Data Services: We sell insights from our data to insurance companies.

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Exploitation – Key outcomes

The key outcomes of the exploitation plan include:

- **Sensor Technologies:** Alcohol detection (Senseair), drug detection (Leitat), fatigue monitoring (Datik, VTI), stress detection (Smart PWA), and cognitive load assessment (DBL).

Sensor technology providers will exploit and sustain their solutions in an individual level

- **PANACEA Platform,** developed by CERTH, CTLup, Loughborough University, Chalmers and Unisystems.

Unisystems and CERTH could lead the exploitation and sustainability of the Panacea platform, forming a Joint Venture, also with other partners, and with a licensing agreements with other consortium partners

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Thank you

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