ภาคผนวก

ภาคผนวก ก
แบบสอบถามของโครงการวิจัยเรื่อง การยอมรับเทคโนโลยีรถไฟความเร็วสูง ในผู้โดยสารสูงอายุ

แบบสอบถามของโครงการวิจัย
เรื่อง การยอมรับเทคโนโลยีรถไฟความเร็วสูงในผู้โดยสารสูงอายุ

รหัสแบบสอบถาม:.....
จังหวัด.....
อำเภอ.....
ตำบล.....

สาขาวิชาวิศวกรรมขนส่ง สำนักวิชาวิศวกรรมศาสตร์ มหาวิทยาลัยเทคโนโลยีสุรนารี

วัตถุประสงค์ : เพื่อศึกษาปัจจัยที่มีอิทธิพลต่อพฤติกรรมการเดินทางและการยอมรับเทคโนโลยีในการเลือกใช้รถไฟฟ้าความเร็วสูงของท่าน เพื่อพัฒนานโยบายด้านการขนส่งและรองรับการใช้งานรถไฟฟ้าความเร็วสูงสำหรับท่านในอนาคต

แบบสอบถาม แบ่งเป็น 3 ตอน จำนวน 4 หน้า ได้แก่

ตอนที่ 1 ข้อมูลทั่วไปและพฤติกรรมการเดินทางของผู้สูงอายุ

ตอนที่ 2 ปัจจัยที่ส่งผลต่อการเดินทางของผู้สูงอายุ

ตอนที่ 3 ปัจจัยด้านการยอมรับเทคโนโลยีการใช้รถไฟฟ้าความเร็วสูงของผู้สูงอายุ

ตอนที่ 1 ข้อมูลทั่วไปและพฤติกรรมการเดินทางของผู้สูงอายุ

คำชี้แจง: โปรดทำเครื่องหมาย ✓ หน้าคำตอบที่ตรงกับความเป็นจริง

1.1) เพศ ○ 1) ชาย ○ 2) หญิง ○ 3) ไม่ระบุ

1.2) อายุ_____ปี **(ข้อมูลมีความสำคัญกับการวิเคราะห์ผล กรุณาให้ข้อมูลและข้อมูลนี้เป็นข้อมูลปกปิด)**

1.3) สถานภาพ ○ 1) โสด ○ 2) สมรส ○ 3) หม้าย/ หย่า/ แยกกันอยู่

1.4) ระดับการศึกษาสูงสุด ○ 1) ประถม ○ 2) มัธยมต้น ○ 3) มัธยมปลาย/ปวช. ○ 4) อนุปริญญา/ปวส.
○ 5) ปริญญาตรี ○ 6) ปริญญาโท ○ 7) ปริญญาเอก ○ 8) อื่น ๆ (โปรดระบุ) _____

1.5) รายได้ (นับรวมรายได้ที่ได้รับจากคนในครอบครัว)_____บาท/เดือน

1.6) จำนวนสมาชิกในครอบครัว_____คน

1.7) ในวันปกติ (วันทำการ) มีลูกหลาน/ผู้ดูแล อยู่บ้านกับท่านหรือไม่ ○ 1) ไม่มี ○ 2) มี

1.8) อาชีพ (ล่าสุด) ○ 1) แม่บ้าน ○ 2) ราชการ/รัฐวิสาหกิจ ○ 3) บริษัทเอกชน ○ 4) ธุรกิจส่วนตัว/ค้าขาย
○ 5) เกษตรกร ○ 6) รับจ้างทั่วไป ○ 7) อื่น ๆ (โปรดระบุ) _____

1.9) เขตที่พักอาศัย ○ 1) ในเมือง ○ 2) นอกเมือง

1.10) โรคประจำตัว (ตอบได้มากกว่า 1) ○ 1) ไม่มีโรคประจำตัว ○ 2) มีปัญหาด้านการเคลื่อนไหว
○ 3) มีปัญหาด้านสายตา ○ 4) มีปัญหาด้านการได้ยิน ○ 5) มีปัญหาด้านการพูด ○ 6) มีปัญหาเกี่ยวกับความจำ
○ 6) มีโรคประจำตัวอื่น ๆ (โปรดระบุ) _____

1.11) ท่านเดินทางระยะไกลด้วยระบบขนส่งประเภทใด (ตอบได้มากกว่า 1 ข้อ)
○ 1) รถ 2 แถว ○ 2) รถตู้ ○ 3) รถบัส ○ 4) รถไฟ
○ 5) เครื่องบิน ○ 6) รถยนต์ส่วนบุคคล ○ 7) Taxi/Grap car

1.12) หากท่านต้องการเดินทางระยะไกลด้วยระบบขนส่งสาธารณะ ท่านเดินทางจากบ้านไปใช้ขนส่งสาธารณะด้วยยาพาหนะใด (ตอบได้มากกว่า 1 ข้อ)
○ 1) รถ 2 แถว ○ 2) รถตู้ ○ 3) รถบัส ○ 4) จักรยานยนต์รับจ้าง
○ 5) รถยนต์ส่วนบุคคล ○ 6) จักรยานยนต์ ○ 7) Taxi/Grap car

1.13) ท่านเดินระยะไกลบ่อยแค่ไหน
○ 1) ทุกวัน ○ 2) สัปดาห์ละ 3-5 ครั้ง ○ 3) สัปดาห์ละ 1-2 ครั้ง ○ 4) เดือนละ 2 ครั้ง
○ 5) เดือนละ 1 ครั้ง ○ 6) น้อยกว่าเดือนละ 1 ครั้ง

1.14) วัตถุประสงค์การเดินทางระยะไกลส่วนใหญ่

○ 1) เพื่อไปทำงาน ○ 2) เพื่อพักผ่อน/ท่องเที่ยว ○ 3) เพื่อเดินทางไปซื้อของ
○ 4) เพื่อกิจกรรมศึกษา/หาเพื่อน ○ 5) ไปหาหมอ/โรงพยาบาล ○ 6) อื่น ๆ (โปรดระบุ) _____

1.15) จากประสบการณ์ ท่านเคยเดินทางจากบ้าน ไปขึ้นรถโดยสารไม่ทัน (ตกรถ) หรือไม่

○ 1) เคย ○ 2) ไม่เคย

1.16) โดยปกติแล้ว ท่านเดินทางไปจากบ้านยังสถานีรถประจำทางหรือรถไฟอย่างไร

○ 1) ไปด้วยตนเอง ○ 2) คนที่บ้านไปส่ง ○ 3) จักรยานยนต์รับจ้าง/แท็กซี่ ○ 3) อื่นๆ ระบุ.....

ตอนที่ 2 ปัจจัยที่ส่งผลต่อพฤติกรรมการเดินทางของผู้สูงอายุ

คำชี้แจง: โปรดทำเครื่องหมาย ✓ ในช่องที่ตรงกับความคิดเห็นของท่าน

ที่	หัวข้อในการพิจารณา	ระดับความคิดเห็น						
		เห็นด้วยอย่างยิ่ง <-> ไม่เห็นด้วยอย่างยิ่ง						
		7	6	5	4	3	2	1
	การคล้อยตามกลุ่มอ้างอิง (Subjective Norm)							
2.1	ท่านคิดว่าครอบครัวและคนรอบข้างมีอิทธิพลในการตัดสินใจเลือกใช้รถไฟฟ้าความเร็วสูง	7	6	5	4	3	2	1
2.2	หากมีเพื่อนวัยเดียวกันแนะนำให้ใช้รถไฟความเร็วสูง ท่านคิดว่าการแนะนำนี้มีผลต่อการตัดสินใจใช้มากขึ้น	7	6	5	4	3	2	1
2.3	เมื่อท่านทราบว่ามีเพื่อนวัยเดียวกันนิยมเดินทางไกลด้วยรถไฟฟ้าความเร็วสูง อาจทำให้ท่านอยากลองใช้บ้าง	7	6	5	4	3	2	1
2.4	การประชาสัมพันธ์ผ่านสื่อต่างๆเช่น หนังสือพิมพ์ โทรทัศน์ สื่อออนไลน์ เกี่ยวกับการใช้งานรถไฟฟ้าความเร็วสูงมีผลต่อการเลือกใช้รถไฟฟ้าความเร็วสูง	7	6	5	4	3	2	1
2.5	ท่านมีแนวโน้มว่าจะเลือกใช้รถไฟฟ้าความเร็วสูงมากขึ้นหากคนในครอบครัวหรือคนรอบตัวใช้	7	6	5	4	3	2	1
	การรับรู้ถึงการควบคุมพฤติกรรม (Perceived Behavioral Control)							
2.6	ขั้นตอนการจองตั๋วหรือซื้อตั๋วรถไฟความเร็วสูงทำได้ง่ายไม่เกินความสามารถของท่าน	7	6	5	4	3	2	1
2.7	การเดินทางมาจากบ้านเพื่อมาใช้รถไฟฟ้าความเร็วสูงไม่เกินความความสามารถของท่าน	7	6	5	4	3	2	1
2.8	ท่านคิดว่าการผสมผสานการเดินทางด้วยรถไฟความเร็วสูงเข้ากับกิจวัตรประจำวันเป็นเรื่องง่าย	7	6	5	4	3	2	1
2.9	ท่านคิดว่าการเดินทางด้วยรถไฟฟ้าความเร็วสูงไม่เป็นอุปสรรคต่อท่าน	7	6	5	4	3	2	1
2.10	ท่านคิดว่าท่านสามารถเดินทางด้วยรถไฟฟ้าความเร็วสูงได้โดยไม่ต้องมีผู้ติดตาม	7	6	5	4	3	2	1
	ทัศนคติเชิงบวก Optimism							
2.11	ท่านเชื่อว่ารถไฟฟ้าความเร็วสูงสามารถปรับปรุงการคมนาคมในประเทศไทยได้	7	6	5	4	3	2	1
2.12	ท่านเชื่อว่ารถไฟฟ้าความเร็วสูงสามารถการตอบสนองความต้องการเดินทางระยะไกลได้	7	6	5	4	3	2	1
2.13	ท่านเชื่อว่าการเดินทางด้วยรถไฟฟ้าความเร็วสูงปลอดภัยกว่าการขนส่งประเภทอื่น	7	6	5	4	3	2	1
2.14	ท่านเชื่อว่าการเดินทางด้วยรถไฟฟ้าความเร็วสูงเป็นการเดินทางที่คุ่มค่า	7	6	5	4	3	2	1
2.15	ท่านเชื่อว่ารถไฟฟ้าความเร็วสูงจะทำให้การคมนาคมสำหรับท่านมีประสิทธิภาพมากขึ้น	7	6	5	4	3	2	1
	นวัตกรรม (Innovativeness)							
2.16	ท่านไม่กังวลใจในการปรับตัวเข้ากับเทคโนโลยีใหม่ๆ ในการใช้รถไฟความเร็วสูง	7	6	5	4	3	2	1
2.17	ท่านยินดีเรียนรู้เกี่ยวเทคโนโลยีใหม่ ๆ ที่เกี่ยวข้องกับชีวิตประจำวัน เช่น การใช้รถไฟฟ้าความเร็วสูง การจองตั๋วออนไลน์	7	6	5	4	3	2	1

ที่	หัวข้อในการพิจารณา	ระดับความคิดเห็น						
		เห็นด้วยอย่างยิ่ง <-> ไม่เห็นด้วยอย่างยิ่ง						
		7	6	5	4	3	2	1
2.18	ท่านมักจะติดตามข่าวสารใหม่ ๆ ที่เกี่ยวข้องกับการพัฒนาเทคโนโลยีอยู่เสมอ	7	6	5	4	3	2	1
2.19	ท่านเชื่อว่าเทคโนโลยีในปัจจุบันสร้างมาเพื่อรองรับการใช้งานของท่าน	7	6	5	4	3	2	1
	ความไม่สะดวกสบาย (Discomfort)							
2.20	ท่านคิดว่ารถไฟฟ้าความเร็วสูงสามารถตอบสนองการเดินทางระยะไกลได้เฉพาะกลุ่ม	7	6	5	4	3	2	1
2.21	ท่านกังวลว่าค่าโดยสารรถไฟฟ้าความเร็วสูงอาจสูงกว่าระบบขนส่งประเภทอื่นๆ	7	6	5	4	3	2	1
2.22	ท่านกังวลว่าสิ่งอำนวยความสะดวกสำหรับท่านอาจไม่ครอบคลุมตลอดการเดินทาง เช่น ห้องน้ำอยู่ไกล มีราวจับพยุงตัวน้อย	7	6	5	4	3	2	1
2.23	ท่านกังวลว่าการเดินทางมายังสถานี สำหรับท่านเป็นเรื่องลำบาก	7	6	5	4	3	2	1
2.24	ท่านกังวลว่ารถสาธารณะที่จะเข้าถึงสถานีอาจมีไม่มาก หรือต้องเดินทางหลายต่อ							
	ความรู้สึกไม่มั่นคง (Insecurity)							
2.25	ท่านรู้สึกไม่มั่นใจกับกระบวนการการเดินด้วยรถไฟฟ้าความเร็วสูง เช่น การเข้าถึงชานชาลา การซื้อตั๋ว	7	6	5	4	3	2	1
2.26	ท่านกังวลว่าหากเกิดเหตุฉุกเฉินขณะโดยสารบนขบวนรถ จะไม่สามารถช่วยเหลือได้ทันถ่วงที่ เช่น เป็นลมชัก มีการปล้น	7	6	5	4	3	2	1
2.27	ท่านคิดว่าท่านไม่สามารถเดินทางด้วยรถไฟฟ้าความเร็วสูงได้โดยไม่มีผู้ติดตาม	7	6	5	4	3	2	1
2.28	ท่านลังเลใจเกี่ยวกับการใช้เทคโนโลยีสำหรับการเดินทาง	7	6	5	4	3	2	1
	ความคาดหวังในประสิทธิภาพ (Performance expectancy)							
2.29	ท่านหวังว่าการใช้รถไฟฟ้าความเร็วสูงจะช่วยเพิ่มความสามารถในการเดินทางได้อย่างมีประสิทธิภาพ เช่น ถึงที่หมายตรงเวลา ประหยัดเวลาเดินทาง	7	6	5	4	3	2	1
2.30	ท่านหวังว่าว่าการเดินทางด้วยรถไฟฟ้าความเร็วสูงทำให้ท่านวางแผนการเดินทางได้อย่างมีประสิทธิภาพ	7	6	5	4	3	2	1
2.31	ท่านหวังว่าว่าการเดินทางด้วยรถไฟฟ้าความเร็วสูงจะช่วยเติมประสบการณ์ที่ดีในการเดินทาง	7	6	5	4	3	2	1
2.32	ท่านหวังว่าการเดินทางด้วยรถไฟฟ้าความเร็วสูงมีความน่าเชื่อถือมากกว่าการเดินทางรูปแบบอื่นๆ	7	6	5	4	3	2	1
2.33	ท่านเชื่อว่ารถไฟฟ้าความเร็วสูงให้ความสำคัญกับความปลอดภัยของผู้โดยสาร	7	6	5	4	3	2	1
	ความคาดหวังของความพยายามใช้รถไฟฟ้าความเร็วสูง (Effort expectancy)							
2.34	ท่านหวังว่าจะสามารถเข้าระบบจองหรือซื้อตั๋วรถไฟฟ้าความเร็วสูงได้โดยไม่ต้องมีคนช่วยเหลือ	7	6	5	4	3	2	1
2.35	ท่านหวังว่ากระบวนการขึ้นลงรถไฟฟ้าความเร็วสูงสามารถทำได้ง่ายด้วยตนเอง	7	6	5	4	3	2	1
2.36	ท่านหวังว่าจะสามารถเข้าถึงบริการเติมเต็มได้ง่ายบนรถไฟฟ้าความเร็วสูง เช่น Wifi ปลั๊กไฟ	7	6	5	4	3	2	1
2.37	ท่านหวังว่าระบบการจัดการของรถไฟฟ้าความเร็วสูงสามารถรับมือได้เมื่อเกิดเหตุขัดข้องหรือการเปลี่ยนแปลงตารางเดินรถ	7	6	5	4	3	2	1
2.38	ท่านหวังว่าภายในสถานีรถไฟฟ้าความเร็วสูงจะมีบริการต่างๆไว้รองรับการเดินทางระยะไกล เช่น ร้านอาหาร ร้านขายของฝาก ตู้ ATM	7	6	5	4	3	2	1
	เงื่อนไขการอำนวยความสะดวก (Facilitating conditions)							
2.39	ท่านคิดว่ามีการรองรับการนำทางไปสถานีรถไฟและชานชาลาที่ไม่ยากต่อการเข้าใจ	7	6	5	4	3	2	1
2.40	ท่านคิดว่าภาครัฐจะมีการสนับสนุนการเดินทางด้วยรถไฟฟ้าความเร็วสูงของท่าน	7	6	5	4	3	2	1

ที่	หัวข้อในการพิจารณา	ระดับความคิดเห็น						
		เห็นด้วยอย่างยิ่ง <-> ไม่เห็นด้วยอย่างยิ่ง						
		7	6	5	4	3	2	1
2.41	ท่านสามารถติดตามข้อมูลข่าวสารเกี่ยวกับการเดินทางด้วยรถไฟฟ้าความเร็วสูง ได้ไม่ยาก	7	6	5	4	3	2	1
2.42	ท่านคิดว่าโหมดการเดินทางรูปแบบอื่น ๆ จะสามารถเชื่อมต่อกับรถไฟฟ้าความเร็วสูง	7	6	5	4	3	2	1
2.43	ท่านคิดว่าจะมีเจ้าหน้าคอยดูแลให้ข้อมูลเกี่ยวกับการใช้งานรถไฟฟ้าความเร็วสูงให้กับผู้สูงอายุโดยเฉพาะ	7	6	5	4	3	2	1

ส่วนที่ 3 ปัจจัยด้านการยอมรับเทคโนโลยีการใช้รถไฟฟ้าความเร็วสูงของผู้สูงอายุ

คำชี้แจง: โปรดทำเครื่องหมาย ✓ ในช่องคำตอบที่ตรงกับความคิดเห็นของท่าน

ที่	ประเด็น	ระดับความคิดเห็น						
		เห็นด้วยอย่างยิ่ง<->ไม่เห็นด้วยอย่างยิ่ง						
		7	6	5	4	3	2	1
	การรับรู้ประโยชน์การใช้รถไฟฟ้าความเร็วสูง (Perceived Usefulness)							
3.1	ท่านมีความเชื่อว่าการใช้รถไฟฟ้าความเร็วสูงจะทำให้การเดินทางของคุณประหยัดเวลามากขึ้นเมื่อเทียบกับการเดินทางรูปแบบอื่น	7	6	5	4	3	2	1
3.2	การใช้รถไฟความเร็วสูงจะช่วยเพิ่มความสามารถในการเดินทางไกลของท่าน	7	6	5	4	3	2	1
3.3	ประโยชน์ของรถไฟความเร็วสูงส่งผลต่อความพยายามที่จะเข้าใช้บริการ เช่น ความสะดวกสบายในการเดินทาง ขั้นตอนในการใช้บริการที่ง่าย	7	6	5	4	3	2	1
3.4	ข้อมูลที่ชัดเจนและเข้าถึงได้เกี่ยวกับบริการรถไฟความเร็วสูงจะช่วยเพิ่มการรับรู้ประโยชน์ในการใช้รถไฟฟ้าความเร็วสูงมากขึ้น	7	6	5	4	3	2	1
3.5	ท่านคิดว่าการเดินทางด้วยรถไฟฟ้าความเร็วสูงเป็นการเดินทางที่เป็นมิตรต่อสิ่งแวดล้อม	7	6	5	4	3	2	1
3.6	ท่านคิดว่าประสิทธิภาพของรถไฟฟ้าความเร็วสูงช่วยยกระดับคุณภาพชีวิตของคนในที่นี้ที่	7	6	5	4	3	2	1
	การรับรู้ความสะดวกการใช้รถไฟฟ้าความเร็วสูง (Perceived Ease of Use)							
3.7	ท่านคิดว่าการใช้รถไฟฟ้าความเร็วสูงจะทำให้คุณไปถึงที่หมายได้ตรงเวลาได้ง่ายขึ้น	7	6	5	4	3	2	1
3.8	ท่านคิดว่าการเรียนรู้การใช้รถไฟฟ้าความเร็วสูงในการเดินทางเป็นเรื่องง่าย	7	6	5	4	3	2	1
3.9	ท่านคิดว่าตัวสถานีและชบวนรถไฟมีสิ่งอำนวยความสะดวกรองรับสำหรับท่าน	7	6	5	4	3	2	1
3.10	การให้ความรู้เกี่ยวกับการใช้งานที่เพียงพอจะช่วยเพิ่มความสะดวกในการใช้งานรถไฟความเร็วสูงสำหรับผู้โดยสารสูงอายุ	7	6	5	4	3	2	1
	ทัศนคติการใช้งานรถไฟฟ้าความเร็วสูง (Attitude Toward Using							
3.11	ท่านคิดว่ารถไฟฟ้าความเร็วสูงสามารถรองรับความต้องการเดินทางของท่านได้	7	6	5	4	3	2	1
3.12	ท่านคิดว่ารถไฟฟ้าความเร็วสูงเป็นทางเลือกการเดินทางที่เหมาะสมและดึงดูดการเดินทางสำหรับท่าน	7	6	5	4	3	2	1
3.13	ท่านคิดว่าการใช้รถไฟฟ้าความเร็วสูงจะช่วยลดปัญหาการเดินทางของท่าน	7	6	5	4	3	2	1
3.14	การใช้รถไฟฟ้าความเร็วสูงไม่มีผลกระทบต่อการรูปแบบการเดินทางรูปแบบอื่นๆของท่าน	7	6	5	4	3	2	1
3.15	ท่านคิดว่าการใช้รถไฟฟ้าความเร็วสูงมีความคุ้มค่าและประหยัดเวลา	7	6	5	4	3	2	1
	ความตั้งใจใช้งานรถไฟฟ้าความเร็วสูง (Behavioral Intention to Use)							
3.16	ท่านคิดว่าการใช้รถไฟฟ้าความเร็วสูงทำให้ท่านรู้สึกปลอดภัยจากโรคระบาดในการเดินทางได้	7	6	5	4	3	2	1

ที่	ประเด็น	ระดับความคิดเห็น						
		เห็นด้วยอย่างยิ่ง<->ไม่เห็นด้วยอย่างยิ่ง						
		7	6	5	4	3	2	1
3.17	ท่านคิดว่าการใช้รถไฟฟ้าความเร็วสูงทำให้ท่านรู้สึกปลอดภัยและลดความเสี่ยงจากอุบัติเหตุ	7	6	5	4	3	2	1
3.18	ท่านมีความตั้งใจจะลองใช้บริการรถไฟฟ้าความเร็วสูงในอนาคต	7	6	5	4	3	2	1
3.19	ท่านคิดว่าการใช้รถไฟฟ้าความเร็วสูงทำให้ท่านรู้สึกสะดวกสบายกว่าการเดินทางด้วยการขนส่งประเภทอื่นๆ ในระยะไกล	7	6	5	4	3	2	1
3.20	การรับรู้ความเสี่ยงที่เกี่ยวข้องกับสุขภาพไม่ส่งผลกระทบต่อความตั้งใจของท่านที่จะใช้รถไฟความเร็วสูง	7	6	5	4	3	2	1
3.21	ท่านคิดว่ากระบวนการจองและซื้อตั๋วรถไฟฟ้าความเร็วสูงส่งผลต่อการตัดสินใจการเดินทาง	7	6	5	4	3	2	1

ภาคผนวก ค
บทความวิชาการที่ได้รับการตีพิมพ์เผยแพร่ในระหว่างศึกษา

รายชื่อบทความวิชาการที่ได้รับการตีพิมพ์เผยแพร่ ในระหว่างศึกษา

Dangbut, A., Watcharamaisakul, F., Champahom, T., Jomnonkwao, S., Wisutwattanasak, P., Phojaem, T., & Ratanavaraha, V. (2024). The Impact of Attitude on High-Speed Rail Technology Acceptance among Elderly Passengers in Urban and Rural Areas: A Multigroup SEM Analysis. Infrastructures, 9(10), 174. doi.org/10.3390/infrastructures9100174

infrastructures

MDPI

Article

The Impact of Attitude on High-Speed Rail Technology Acceptance among Elderly Passengers in Urban and Rural Areas: A Multigroup SEM Analysis

Adisorn Dangbut [1], Fareeda Watcharamaisakul [2], Thanapong Champahom [3], Sajjakaj Jomnonkwao [1,*], Panuwat Wisutwattanasak [2], Thanakorn Phojaem [1] and Vatanavongs Ratanavaraha [1]

[1] School of Transportation Engineering, Institute of Engineering, Suranaree University of Technology, Nakhon Ratchasima 30000, Thailand; m6502546@g.sut.ac.th (A.D.); m6401917@g.sut.ac.th (T.P.); vatanavongs@g.sut.ac.th (V.R.)
[2] Institute of Research and Development, Suranaree University of Technology, Nakhon Ratchasima 30000, Thailand; fareeda@sut.ac.th (F.W.); panuwat.w@g.sut.ac.th (P.W.)
[3] Department of Management, Faculty of Business Administration, Rajamangala University of Technology Isan, Nakhon Ratchasima 30000, Thailand; thanapong.ch@rmuti.ac.th
* Correspondence: sajjakaj@g.sut.ac.th; Tel.: +66-4422-4251; Fax: +66-4422-4608

Abstract: This study investigates the impact of the attitudes of the elderly on the acceptance of Thailand's high-speed rail technology according to the technology readiness index (TRI) and technology acceptance model (TAM) theories as guidelines for policies or strategies to enhance passengers' intentions to use high-speed rail. A self-administered questionnaire was used to collect data from 3200 elderly people aged over 60 years in the surveyed areas along high-speed rail routes in Thailand, before the use of statistical analysis and multigroup structural equation modeling (SEM) to analyze variations in the participants' attitudes toward urban and rural areas. The results that were thus obtained from both groups showed their differing attitudes toward the acceptance of technology. The TAM theory considers the attitude toward high-speed rail use in urban areas to be important, while, in rural areas, attitudes and perceived usefulness are important. With respect to the ease of use of high-speed rail, the most important factors were attitudes toward use and perceived usefulness. For the TRI theory, innovativeness features as the most positive influence on the perceived ease of high-speed rail use in both groups. Optimism and innovativeness were positive influences, but discomfort and insecurity carried a negative influence with respect to the perceived ease of use and usefulness.

Keywords: high-speed rail; elderly; SEM multigroup analysis; technology readiness index; technology acceptance model

Citation: Dangbut, A.; Watcharamaisakul, F.; Champahom, T.; Jomnonkwao, S.; Wisutwattanasak, P.; Phojaem, T.; Ratanavaraha, V. The Impact of Attitude on High-Speed Rail Technology Acceptance among Elderly Passengers in Urban and Rural Areas: A Multigroup SEM Analysis. *Infrastructures* **2024**, *9*, 174. https://doi.org/10.3390/infrastructures9100174

Academic Editor: Maciej Kruszyna

Received: 6 September 2024
Revised: 27 September 2024
Accepted: 1 October 2024
Published: 3 October 2024

1. Introduction

Thailand is currently facing becoming an aged society [1], as senior citizens are more than 13 million (20.36%) of its total population [2], with a continuously increasing trend. The Social Policy and Innovation Development Division predicts [3] that in 2038 there will be around 20 million senior citizens, or 30.4% of the total population. In response, the government has launched a critical policy for aging people as a national agenda, carrying out such operations in accordance with their rights and welfare. The Elderly Act 2003, Section 11, determines the rights of the elderly for protection, promotion, and support in 13 aspects, including the provision of their direct comfort and safety in buildings, locations, vehicles, or other sites where public services are provided, as well as suitable supplementary fares for transportation [4].

In 2022, the government approved the budget for Phase 1 (Bangkok–Nakhon Ratchasima) of the construction of the Bangkok–Nong Khai high-speed rail line, which is scheduled

to be completed and ready for service by 2028 [5]. This is part of the high-speed rail development plan that is enhancing many routes, carrying out the 20-year national strategy (2017–2036) [6] according to which four high-speed rail routes will be completed by 2037 [7]. As soon as the service is fully operational, it will provide significant convenience for elderly passengers as a result of its innovative technology that facilitates their travel [8–10], serving their travel needs and welfare, following the Elderly Act 2003, Section 11 [4]. Studying attitudes among the elderly toward high-speed rail technology, which will manifest in their future, is important as part of the guidelines for a service policy incorporating elderly passengers [10,11].

Previous studies concerning the technology acceptance of high-speed rail among a common population group have been undertaken using different methods [12–14], but they have paid little attention to the elderly, who are only part of the sample [15]. Only a few studies have specifically included them [16–19], using exploratory factor analysis and confirmatory factor analysis (CFA), along with structural equation modeling (SEM) [17,20,21] for the data analysis. In the study of technology acceptance among elderly adults, few studies have utilized the technology readiness index (TRI) [22,23] or the technology acceptance model (TAM) [24,25], or combined the TRI and the TAM [20,21]. The combined use of both theories offers valuable insights into elderly adults' attitudes toward technology. However, existing studies have predominantly focused on health technologies, with limited attention given to transportation technologies, which are crucial for enhancing mobility among the elderly population. Nevertheless, no research has been conducted on the differences in the contexts of urban and rural areas, where different social characteristics, socioeconomic backgrounds, basic attitudes, and environments produce different behaviors or intentions [26–29]. Thus, policies and recommendations do not take into account geographic differences, which are important reasons that could affect the acceptance of new technology. The given policy does not take into account the readiness and needs in the given area context, especially among the rural elderly, who have a reduced opportunity to access technology; therefore, this study aims to achieve two primary objectives: (1) to examine the factors influencing technology acceptance among the elderly by integrating the TRI and TAM; and (2) to apply SEM multigroup analysis to identify differences in attitudes affecting the acceptance of high-speed rail technology among the elderly across various contexts (urban and rural areas). Previous studies have explored the differing perspectives of urban and rural elderly adults regarding technology and transportation [30,31]. To address the research question concerning the factors that affect high-speed rail technology acceptance among elderly passengers in different area contexts as a guideline for the development of policies taking into account the unique characteristics of each area, we have set forth an initiative that is important for creating sustainability and efficiency in operations. To achieve maximum success, the policies that are to be created must develop a positive attitude to technology, along with its acceptance. This can result in the intention of elderly passengers to use high-speed rail when the service is fully operational. This study is, therefore, intended to create an answer for the future direction of Thailand's high-speed rail.

2. Materials and Methods

This section mentions a review of the concepts, theories, and related research that form an important basis for an understanding of the topics or issues that are related to this study.

Previous studies on technology adoption among elderly people have often emphasized the barriers they face, such as limited familiarity with digital technologies, concerns regarding their use, and discomfort with change [18–21]. However, these studies have largely overlooked transport technologies, which are crucial for enhancing mobility and independence among elderly people, and understanding how elderly people perceive high-speed rail technology could provide valuable insights for designing more comprehensive transport policies and services.

2.1. Technology Readiness Index

The TRI forms an approach to the assessment of overall technology readiness (TR) among those with different qualifications and personalities and who may have different perspectives on technology [23]. In addition, it can provide policymakers seeking to understand the capabilities of technology using valuable and extensive insightful information to help identify the areas requiring improvement or to be addressed to increase the limits of access to that technology. In other words, the user must learn more profoundly to understand the technological system to be used. Likewise, exploiting the usefulness of this technology is the user's main goal for controlling the technology system [32]. According to Parasuraman's study [22], the TRI has the following four components:

2.1.1. Optimism

Optimism in this regard relates to viewing technology from a positive viewpoint and believing that it will make life better and make things easier. People who are equipped with this characteristic have a positive attitude toward using technology (AT) [33]. According to earlier studies, optimism among the elderly is correlated with perceived usefulness (PU) and perceived ease of use (PEU) [20,21,34]. The hypotheses suggested according to this direction are as follows:

H1u: *Optimism regarding technology acceptance has a positive influence on the PEU of high-speed rail among the urban elderly.*

H2u: *Optimism regarding technology acceptance has a positive influence on the PU of high-speed rail among the urban elderly.*

H1r: *Optimism regarding technology acceptance has a positive influence on the PEU of high-speed rail among the rural elderly.*

H2r: *Optimism regarding technology acceptance has a positive influence on the PU of high-speed rail among the rural elderly.*

2.1.2. Innovativeness

Innovativeness represents the measurement of an individual's willingness to try new things and adopt the use of new technology. This dimension is also considered as a factor that influences TR, as individuals who are more creative tend to be more open to new technology [35]. In addition, [21] indicated that innovativeness that affects the elderly may be beneficial to users' experience and help to make them adjust to more ably access that technology. Similarly, educating users can help increase their understanding of technology even more [20]. From this, the hypotheses suggested for this study are as follows:

H3u: *Innovativeness regarding technology acceptance has a positive influence on the PEU of high-speed rail among the urban elderly.*

H4u: *Innovativeness regarding technology acceptance has a positive influence on the PU of high-speed rail among the urban elderly.*

H3r: *Innovativeness regarding technology acceptance has a positive influence on the PEU of high-speed rail among the rural elderly.*

H4r: *Innovativeness regarding technology acceptance has a positive influence on the PU of high-speed rail among the rural elderly.*

2.1.3. Discomfort

Discomfort can hinder TR; the measurement of this assesses an individual's discomfort or anxiety in the use of new technology. This dimension may have a negative effect on an individual's willingness to adopt and use it [35]. For example, a study [36] identified that discomfort kept the elderly from feeling comfortable or kept them from being open to technology use acceptance. The hypotheses suggested for this study are as follows:

H5u: *Discomfort regarding technology acceptance has a negative influence on the PEU of high-speed rail among the urban elderly.*

H6u: *Discomfort regarding technology acceptance has a negative influence on the PU of high-speed rail among the urban elderly.*

H5r: *Discomfort regarding technology acceptance has a negative influence on the PEU of high-speed rail among the rural elderly.*

H6r: *Discomfort regarding technology adoption has a negative influence on the PU of high-speed rail among the rural elderly.*

2.1.4. Insecurity

Insecurity refers to the feeling of being uncertain concerning new technology and incorporates concern regarding the possible negative effects of using it [22]. This is consistent with the work of [37], who found that insecurity is an important factor in the elderly's willingness to experience new technology acceptance, indicating that the willingness of the elderly to adopt technology is influenced by perceived value, quality of life, and their confidence in the use of technology. Perceived insecurity, therefore, is negatively related to such factors. However, insecurity is positively related to discomfort and negatively correlated with motivation or intention [35]. Drawing on this, the hypotheses suggested for this study are as follows:

H7u: *Insecurity regarding technology acceptance has a negative influence on the PEU of high-speed rail among the urban elderly.*

H8u: *Insecurity regarding technology acceptance has a negative influence on the PU of high-speed rail among the urban elderly.*

H7r: *Insecurity regarding technology acceptance has a negative influence on the PEU of high-speed rail among the rural elderly.*

H8r: *Insecurity regarding technology acceptance has a negative influence on the PU of high-speed rail among the rural elderly.*

2.2. Technology Acceptance Model

The TAM was developed from the Theory of Reasoned Action developed by Fishbein and Ajzen [38]. It predicts technology acceptance and is used in the work of Davis and Bagozzi [39]. The TAM is a theory that is used to explain the relationship between the causes and consequences of the adoption or rejection of new technology [40]. The authors of [39] explained that the theory of technology acceptance relates to two main factors: PU and PEU, which together determine the attitudes toward and behavioral intention to use (BI) a technology [41,42]. Here, the impact of technology acceptance among the elderly regarding their AT of the high-speed rail service is examined. In this article, the authors review previous studies on both factors as follows:

2.2.1. Perceived Ease of Use

Perceived ease of use is the user's sense of how easy it is to use the technology [43,44]. It helps assess the belief of the elderly that technology is user-friendly and easy to use [45]. In addition, where the PEU is high, the technology attracts elderly users due to the appearance of the device, including beautiful displays, etc. [46]. In addition, knowledge facilitation and instructions for use make it easier for senior citizens to use the technology [47]. However, usage conditions and health problems may have an effect on inhibiting intentions to use new technology [19]. We test the following hypotheses.

H9u: *PEU regarding technology acceptance has a positive influence on the PU of high-speed rail among the urban elderly.*

H10u: *PEU regarding technology acceptance has a positive influence on the AT of high-speed rail among the urban elderly.*

H9r: *PEU regarding technology acceptance has a positive influence on the PU of high-speed rail among the rural elderly.*

H10r: *PEU regarding technology acceptance has a positive influence on the AT of high-speed rail among the rural elderly.*

2.2.2. Perceived Usefulness

Perceived usefulness describes the belief about a technology that it could potentially be efficient for users [43,44]. From the perspective of the elderly, it can also reflect the belief level that the given technology can help bring about a superior experience [18,45]. The factors affecting PU include users' experiences and norms and the compatibility between users and technology [19]. We here test the following hypotheses:

H11u: *PU regarding technology acceptance has a positive influence on the AT of high-speed rail among the urban elderly.*

H12u: *PU regarding technology acceptance has a positive influence on the BI high-speed rail among the urban elderly.*

H11r: *PU regarding technology acceptance has a positive influence on the AT of high-speed rail among the rural elderly.*

H12r: *PU regarding technology acceptance has a positive influence on the BI high-speed rail among the rural elderly.*

2.2.3. Attitude toward Using

Attitude toward using forms an assessment of the elderly's overall feelings with respect to the use of technology. A positive attitude toward the use of technology tends to increase acceptance among the elderly [41,45]. Therefore, the attitude of the elderly toward using can be determined by examining their feelings and their behavior [48]. The AT technology also affects behavioral intention. We test the following hypotheses:

H13u: *Attitude toward using technology has a positive influence on the BI high-speed rail among the urban elderly.*

H13r: *Attitude toward using technology has a positive influence on the BI high-speed rail among the rural elderly.*

The theory noted is the typical theory, widely accepted for studying the factors that influence the acceptance and use of new technology at present. It focuses on and pays

attention to the factors of the PEU and PU of technology resulting in the AT and the behavioral intention to use a technology and the behavior of real-use acceptance. Integrating the technology readiness index with the technology acceptance model is important to understand how elderly adults accept technology. This integration considers not only the usability of the technology but also the mental readiness of elderly users. The TAM alone has limitations in explaining technology adoption among elderly adults. However, incorporating the TRI can enhance its explanatory power. Key factors from the TRI, such as optimism and innovativeness, significantly impact the core components of the TAM, such as perceived usefulness and ease of use. This integrated model demonstrates an improved predictive capability and helps to address the specific needs of the aging population. This approach contributes to the existing literature by highlighting both the technological and psychological aspects of technology adoption [20]. The researcher has adopted this theory as a conceptual framework concerning the acceptance of high-speed rail technology by elderly passenger groups in different areas of contexts (urban and rural), since the two groups of elderly have different perspectives on technology [30], and the study by [31] also indicates that elderly passengers in rural areas have more barriers to accessing transportation than elderly passengers in urban areas; for example, mass transit systems are not widely available or take a long travel distance to reach. Therefore, it is a reason why the perspectives on the transportation systems of elderly passengers in urban and rural areas may differ. In particular, the elderly in rural areas, who have less access to technology and transportation, may have a lower perceived ease of use than the elderly in urban areas or may have more discomfort than the elderly in urban areas. To validate this concept, the above hypothesis was formulated.

3. Research Methodology

3.1. Data

This study is conducted on the basis of a causal relationship analysis model that is based on the TRI and TAM theories of elderly people living in urban and rural areas in Thailand, as indicated in Figure 1, with the goal of evaluating the correlations among the impacts of elderly passengers' attitudes on the acceptance of high-speed rail technology. This study collected self-report questionnaires, with trained personnel engaging with the questions to help read and explain the questionnaires, from elderly people aged 60 years and over, following the definition of elderly people in transportation used in the UK and the United Nations [49]. In this sample group, 3200 people in four regions of Thailand and four provinces in each region, totaling sixteen provinces, were selected along the high-speed rail route, following government policy [6,7]. In each province, the data were divided by the respondent's residential area: urban areas (meaning areas having a large, high-density community living together with good infrastructural development) and rural areas (meaning areas characterized by small, low-density settlements and limited infrastructure development) [50]. Elderly people in the urban and rural areas of Thailand differ not only in terms of access to infrastructure and technology but also in their social and cultural experiences, which play a significant role in influencing their readiness to adopt new transport technologies. The social and cultural differences between urban and rural elderly people in Thailand have a clear impact on technology adoption. Urban elderly people often face lives separated from their families and communities as their children work outside the home. As a result, they increasingly rely on technology for communication and accessing telehealth services. Conversely, elderly people in rural areas, who live in extended families and maintain strong community ties, tend to rely more on their surrounding social networks. As a result, they may adopt new technologies more slowly, as they do not perceive an urgent need for technology in communications or remote healthcare services [30].

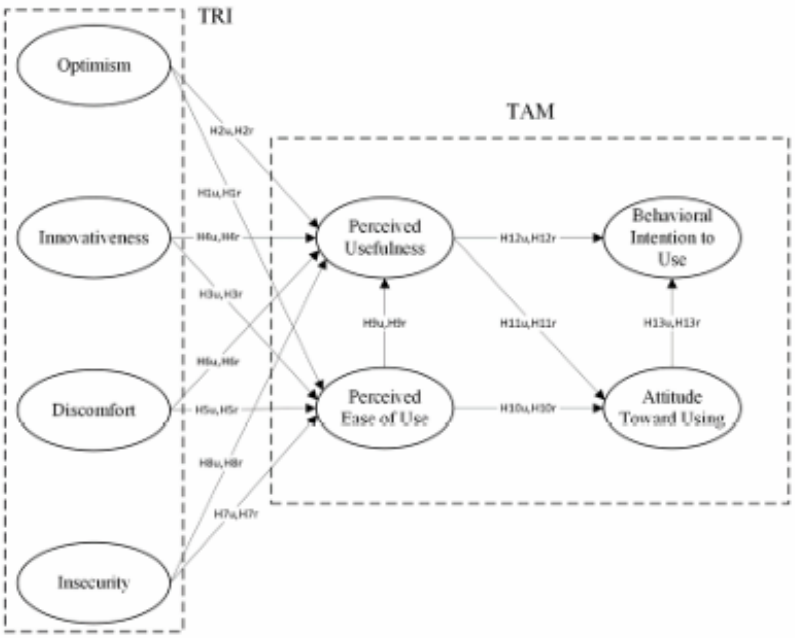

Figure 1. Research framework of the technology readiness index and technology acceptance model.

The questionnaire consisted of three main sections: the first included general information and respondents' travel behavior, as reported in Table 1; the second section, regarding factors concerning the travel of the elderly under the TRI theory, consisted of four factors and 18 items, as shown in Table 2; and the last part of the questionnaire included the factors regarding high-speed rail technology acceptance among the elderly under the TAM theory, with four factors and 15 items, as shown in Table 3. All the items were measured on a seven-point Likert scale, ranging from 1 = strongly disagree to 7 = strongly agree.

Table 1. Respondents' characteristics.

Variable/Questionnaire		Urban		Rural	
		Frequency	Percentage	Frequency	Percentage
Gender					
	Male	896	56.0	851	53.2
	Female	704	44.0	750	46.8
Education level					
	Below bachelor's degree	1295	80.9	1295	80.9
	Bachelor's degree	238	14.9	255	15.9
	More than a bachelor's degree	67	4.2	51	3.2
Occupation					
	Housewife	213	13.3	208	13.0
	Government/state enterprise	81	5.1	77	4.8
	Private company employee	137	8.6	106	6.6
	Private business/trading	521	32.6	491	30.7
	Farmer	253	15.8	369	23.0
	General employee	395	24.7	350	21.9

Table 1. *Cont.*

Variable/Questionnaire		Urban		Rural	
		Frequency	Percentage	Frequency	Percentage
How often do you travel long distances?					
	3–7 times a week	123	7.7	102	6.4
	1–2 times a week	166	10.4	130	8.1
	1–2 times a month or less	1311	81.9	1369	85.5
Most long-distance travel purposes					
	To work	146	9.1	108	6.7
	To travel/sports activities/ find friends	700	43.8	697	43.5
	To travel to buy things	190	11.9	231	14.4
	To the doctor/hospital	564	35.3	565	35.3
How do you normally travel from your home to the bus or train station?					
	By yourself	569	35.6	550	34.4
	People at home sent	749	46.8	840	52.5
	Motorcycle for hire/taxi	282	17.6	211	13.2
Age		67.9 years		67.2 years	
Average personal income		13,908 THB		12,874 THB	

Table 2. Descriptive variables in the technology readiness index (TRI).

Item	Latent Variable/ Questionnaire	Urban				Rural			
		M	SD	SK	KU	M	SD	SK	KU
	Optimism (Cronbach's Urban = 0.910, Rural = 0.889)								
OP1	He believes that high-speed rail can improve transportation in Thailand.	5.820	1.075	−0.576	−0.345	5.490	1.106	−0.448	−0.044
OP2	He believes that high-speed rail can meet the demand for long-distance travel.	5.810	1.046	−0.595	0.007	5.530	1.070	−0.543	0.353
OP3	Do you believe that traveling by high-speed rail is safer than other types of transportation?	5.700	1.094	−0.610	0.018	5.410	1.099	−0.611	0.462
OP4	He believes that traveling by high-speed rail is a worthwhile journey.	5.790	1.078	−0.699	0.031	5.390	1.096	−0.493	0.206
OP5	Do you believe that the high-speed rail will make transportation for you more efficient?	5.770	1.153	−0.915	0.881	5.490	1.145	−0.515	0.083
	Innovativeness (Cronbach's Urban = 0.918, Rural = 0.886)								

Table 2. *Cont.*

Item	Latent Variable/ Questionnaire	Urban				Rural			
		M	SD	SK	KU	M	SD	SK	KU
IN1	He is not worried about adapting to new technology. in using high-speed rail.	5.080	1.294	−0.460	−0.162	5.030	1.158	−0.205	−0.273
IN2	You are willing to learn about new technology related to daily life, such as the use of high-speed rail. online ticket booking	5.050	1.268	−0.494	0.031	5.120	1.141	−0.518	0.333
IN3	You always follow new news related to technological developments.	4.960	1.377	−0.539	−0.074	4.930	1.200	−0.287	−0.063
IN4	You believe that today's technology was created to support your use.	5.040	1.360	−0.611	0.324	5.020	1.185	−0.299	−0.099
	Discomfort (Cronbach's Urban = 0.896, Rural = 0.877)								
DF1	Do you think that high-speed electric rail can respond to long-distance travel for specific groups of people?	4.610	1.491	−0.198	−0.725	4.330	1.393	−0.066	−0.608
DF2	Are you concerned that the fare for the high-speed rail may be higher than other types of transportation?	4.750	1.522	−0.225	−0.837	4.470	1.404	−0.065	−0.868
DF3	Are you worried that the amenities for you may not be covered throughout the trip, such as the bathroom being far away? There is a small handrail.	4.680	1.476	−0.175	−0.795	4.430	1.424	−0.180	−0.672
DF4	Are you worried about traveling to the station? For you it is difficult.	4.620	1.515	−0.228	−0.696	4.400	1.433	−0.167	−0.627
DF5	You are concerned that there may not be many public vehicles to access the station. or have to travel many times	4.690	1.454	−0.178	−0.845	4.370	1.506	−0.045	−0.809
	Insecurity (Cronbach's Urban = 0.888, Rural = 0.900)								
IC1	Do you feel unsure about the process of traveling by high-speed rail, such as accessing the platform or purchasing tickets?	4.520	1.391	−0.050	−0.738	4.430	1.407	−0.128	−0.611
IC2	Are you worried that if an emergency occurs while traveling on the train? Will not be able to help in time, such as having a seizure or robbery.	4.380	1.679	−0.156	−0.855	4.390	1.575	−0.224	−0.697

Table 2. *Cont.*

Item	Latent Variable/ Questionnaire	Urban				Rural			
		M	SD	SK	KU	M	SD	SK	KU
IC3	Do you think you cannot travel on the high-speed rail without an accompanying person?	4.190	1.641	−0.072	−0.759	4.210	1.572	−0.127	−0.809
IC4	Are you hesitant about using technology for travel?	4.260	1.551	−0.066	−0.631	4.260	1.494	−0.187	−0.534

Note: M = mean, SD = standard deviation, SK = skewness, and KU = kurtosis.

Table 3. Descriptive variables in the technology acceptance model (TAM).

Item	Latent Variable/Questionnaire	Urban				Rural			
		M	SD	SK	KU	M	SD	SK	KU
	Perceived Usefulness (Cronbach's Urban = 0.811, Rural = 0.793)								
PU1	You believe that using the high-speed rail will make your travel time more time-efficient compared to other forms of travel.	5.740	1.006	−0.727	0.759	5.700	1.010	−0.555	0.137
PU2	Using high-speed rail will increase your ability to travel long distances.	5.690	1.123	−0.930	1.014	5.740	1.007	−0.774	0.881
PU3	The benefits of high-speed rail affect efforts to access the service, such as travel convenience. The steps for using the service are simple.	5.770	1.035	−0.737	0.764	5.740	1.074	−0.834	0.963
	Perceived Ease of Use (Cronbach's Urban = 0.830, Rural = 0.831)								
PEU1	Do you think that using the high-speed rail will make it easier for you to reach your destination on time?	5.870	1.012	−0.780	0.469	5.660	1.014	−0.464	0.055
PEU2	Do you think learning to use the high-speed rail to travel is easy?	5.620	1.195	−0.808	0.374	5.560	1.078	−0.629	0.563
PEU3	Do you think that the station and train have facilities for you?	5.750	1.110	−0.976	1.237	5.650	1.077	−0.789	0.976
PEU4	Providing adequate knowledge about their use will help increase the convenience of using high-speed rail for elderly passengers.	5.820	1.066	−0.872	0.805	5.760	1.069	−0.832	0.858

Table 3. *Cont.*

Item	Latent Variable/Questionnaire	Urban				Rural			
		M	SD	SK	KU	M	SD	SK	KU
	Attitude Toward Using (Cronbach's Urban = 0.877, Rural = 0.838)								
AT1	Do you think that the high-speed rail can support your travel needs?	5.560	1.239	−1.040	1.503	5.560	1.078	−0.535	0.369
AT2	Do you think that high-speed rail is a suitable and attractive travel option for you?	5.510	1.270	−1.071	1.427	5.490	1.093	−0.521	0.215
AT3	Do you think that using the high-speed rail will reduce your travel problems?	5.450	1.256	−1.040	1.580	5.500	1.060	−0.491	0.213
AT4	Using the high-speed rail has no effect on your other forms of travel.	5.590	1.183	−0.858	0.902	5.460	1.156	−0.482	−0.132
AT5	Do you think that using the high-speed rail is worthwhile and time—saving?	5.620	1.170	−0.761	0.365	5.600	1.140	−0.686	0.203
	Behavioral Intention to Use (Cronbach's Urban = 0.835, Rural = 0.763)								
BI1	Do you think that using the high-speed rail makes you feel safe and reduces the risk of accidents?	5.450	1.186	−0.964	1.445	5.430	1.148	−0.772	1.074
BI2	Do you intend to try using the high-speed rail service in the future?	5.620	1.342	−1.183	1.534	5.710	1.125	−0.851	1.052
BI3	Do you think that using the high-speed rail makes you feel more comfortable than traveling with other types of transportation over long distances?	5.530	1.196	−1.004	1.394	5.530	1.039	−0.539	0.215

Note: M = mean, SD = standard deviation, SK = skewness, and KU = kurtosis.

3.2. *Measurements and Structural Models*

Mplus was used to conduct the multigroup analysis in SEM. It included a measurement model for examining factor analysis, reliability, and convergent analysis. Factor analysis forms the first step in the analysis, determining the relationship between the observed indicator items and latent attitudinal constructs. This study used the CFA, as the observed indicator items are founded on the TRI theory [22,23] and TAM theory [24,25]. Factor analysis tests hypotheses regarding whether a relationship between the structures of specified variables is consistent [51]. This method is widely used in social science research [52]. Further, the model fit for comparison between the theoretical model and actual data was evaluated through checking the factor loading for each item, which should be more than 0.6 [53], as well as the goodness of fit index indicators for the measurement model, which were as follows: $\chi 2/df$ should be less than 5; the Tucker–Lewis Index (TLI) should be greater than 0.80, as recommended by Hooper and Coughlan [54]; and the

RMSEA should be less than or equal to 0.08 [55]. In addition, Hu and Bentler [56] indicated that the CFI should be greater than 0.90 and the SRMR should be less than or equal to 0.08. After examining the goodness of fit index, the next step was to calculate the construct reliability (CR) for the convergent validity and the average variance extracted (AVE) for the discriminant validity [57]. Fornell and Larcker [58] recommend that the CR be at least 0.70 and that the AVE be more than 0.50. After examining the factor analysis, reliability, and convergent analysis, a multigroup SEM analysis was conducted.

A multigroup SEM uses a model to apply to respondents with different characteristics, such as gender or culture, comparing them using the same structural model [27,59]. A questionnaire that is designed to check the equivalence of two groups is also known as an invariance measurement equivalence. Such a measurement model is evaluated using cross-validation to analyze different parameters in the SEM, such as the number of constructs, indicator factor loadings, means, and covariances. However, the statistical difference values of $\chi 2$ (delta-$\chi 2$) and different values of degree of freedom (delta-df) were used to evaluate the differences [60]. The results were examined to establish the difference between the parameters of the two models to determine whether the variance was significantly different [60,61]. It also helped identify the relationship between variables as a guideline for testing hypotheses concerning correlations between the observed and latent variables [62], providing insight into the factors affecting the differences to interpret the meaning of the given context for the analysis of the data. This is useful for data presentation. It allows researchers to provide appropriate suggestions for policy and the improvement of guidelines or the resolution of problems.

This study compared the differences in technology acceptance attitudes toward high-speed rail between elderly passengers in urban and rural areas. The generated model compared factorial invariances through forcing their parameters, such as factor loadings and intercepts, for holding in equal groups. Thus, in spite of the presence of two populations, the parameter values were not different. The generated model allowed the parameter values to be assessed independently [63]. This approach resulted in unequally valued factors for the two models [27,61].

4. Results

4.1. Respondents' Personal Information

A representative group of 3200 elderly passengers aged 60 years and older across Thailand [49] was made up of 1600 urban and 1600 rural residents. The respondents had the general characteristics shown in Table 1. Both respondent groups were mostly men; 80.9% had less than a bachelor's degree in both groups. A plurality of the urban elderly were the most engaged in personal business or trading before retirement (32.6%), similar to 30.7% of those in rural areas. The frequency of long-distance travel among the elderly in both urban and rural areas was only 1 or 2 times a month or less for more than 80%. In the comparison of urban and rural areas, urban elderly people traveled long distances more often than those in rural areas, around 3–7 times per week, or 7.7%, while only 6.4% of rural elderly passengers traveled long distances. The purpose of traveling was the same in both groups: travel to relax, travel to play sports, and travel to meet friends as much as possible for 43.8% of urban elderly passengers and 43.5% for rural elderly ones, followed by traveling to see a doctor or hospital, 35.3%. Elderly passengers living in urban areas generally had family members accompany them (46.8%) or traveled by themselves (35.6%). Rural elderly passengers had similar travel patterns to urban elderly people, with 52.5% accompanied by family members and 34.4% traveling on their own. The average age of urban elderly passengers was 67.9 years, and they had an average income of THB 13,908 per month. Elderly passengers in rural areas had an average age of 67.2 years and an average income of THB 12,874 per month.

4.2. Descriptive Statistics

The thirty-three variables observed from the questionnaire data were divided into the observed variables from the TRI theory, as shown in Table 2, including eighteen observed and four latent variables, and from the TAM theory, as shown in Table 3, including fifteen observed variables and four latent variables. The skewness values for the 33 variables were between −1.183 and −0.050, and the kurtosis values were between −0.855 and 1.580. In the rural elderly passenger group, the skewness values were between −0.851 and −0.045, and the kurtosis values were between −0.868 and 1.074, using the maximum likelihood estimation for the analysis. For the SEM analysis, the parameters should have a skewness value not greater than 2 and a kurtosis value not greater than 7 [64,65].

For the measurement of the research instrument reliability, the Cronbach's alpha values for all eight latent variables for the urban elderly group ranged from 0.811 to 0.918, while those of the rural elderly people extended from 0.763 to 0.900. This indicated that the Cronbach's alpha values for all eight latent variables was greater than 0.7, certifying that the set of question items in each latent variable showed a good correlation with the measurements of the characteristics [66]. After probing the relationship of the observed variables in each latent variable, the CFA was assessed, as shown in Section 4.3, to check and confirm the construct validity of the instrument created according to the theory [57]. This forms a part of the SEM analysis. Section 4.4 provides reliability testing by checking how much quality and reliability the variables had.

4.3. Results of the Confirmatory Factor Analysis

The CFA of the data divided into urban and rural areas, as shown in Tables 4 and 5, showed observed variables from 0.600 to 0.881 in the urban group, while those of the rural group ranged from 0.593 to 0.884. All the observed variables were significant ($p < 0.001$). The reliability was assessed using composite reliability (CR) values for the groups, showing values between 0.990 and 0.997 within the acceptable reliability range of values of 0.7 or higher, along with the average variance extracted (AVE) for both groups: the urban group ranged from 0.557 to 0.740 and the rural group from 0.520 to 0.703 within the acceptable reliability range as well (greater than 0.5) [58]. This indicates that the observed variables were consistent across the latent variables. Consequently, the SEM was analyzed in the next step.

Table 4. Factor analysis for the confirmatory factor analysis (CFA) of the technology readiness index (TRI).

Item/Measurement Model	Urban					Rural				
	Loading	*p*-Value	Error Variance	CR	AVE	Loading	*p*-Value	Error Variance	CR	AVE
Optimism				0.997	0.670				0.996	0.616
OP1	0.787	<0.001	0.011			0.746	<0.001	0.013		
OP2	0.844	<0.001	0.009			0.815	<0.001	0.010		
OP3	0.810	<0.001	0.010			0.765	<0.001	0.012		
OP4	0.821	<0.001	0.010			0.785	<0.001	0.012		
OP5	0.829	<0.001	0.009			0.812	<0.001	0.011		
Innovativeness				0.997	0.740				0.996	0.664
IN1	0.848	<0.001	0.008			0.803	<0.001	0.011		
IN2	0.876	<0.001	0.007			0.845	<0.001	0.010		
IN3	0.881	<0.001	0.007			0.844	<0.001	0.010		
IN4	0.836	<0.001	0.009			0.765	<0.001	0.012		
Discomfort				0.997	0.633				0.996	0.652
DF1	0.685	<0.001	0.015			0.745	<0.001	0.013		
DF2	0.789	<0.001	0.011			0.803	<0.001	0.011		
DF3	0.850	<0.001	0.009			0.846	<0.001	0.009		

Table 4. *Cont.*

Item/Measurement Model	Urban					Rural				
	Loading	*p*-Value	Error Variance	CR	AVE	Loading	*p*-Value	Error Variance	CR	AVE
DF4	0.847	<0.001	0.009			0.831	<0.001	0.010		
DF5	0.798	<0.001	0.011			0.635	<0.001	0.016		
Insecurity				0.996	0.673				0.997	0.703
IC1	0.762	<0.001	0.013			0.733	<0.001	0.013		
IC2	0.851	<0.001	0.009			0.874	<0.001	0.008		
IC3	0.820	<0.001	0.010			0.854	<0.001	0.008		
IC4	0.845	<0.001	0.010			0.884	<0.001	0.007		

Note: CR = composite reliability; and AVE = average variance extraction.

Table 5. Factor analysis for the confirmatory factor analysis (CFA) of the technology acceptance model (TAM).

Item/Measurement Model	Urban					Rural				
	Loading	*p*-Value	Error Variance	CR	AVE	Loading	*p*-Value	Error Variance	CR	AVE
Perceived Usefulness				0.993	0.590				0.992	0.568
PU1	0.726	<0.001	0.014			0.731	<0.001	0.015		
PU2	0.799	<0.001	0.012			0.802	<0.001	0.013		
PU3	0.777	<0.001	0.013			0.725	<0.001	0.015		
Perceived Ease of Use				0.994	0.557				0.994	0.553
PEU1	0.699	<0.001	0.015			0.706	<0.001	0.015		
PEU2	0.767	<0.001	0.013			0.748	<0.001	0.014		
PEU3	0.817	<0.001	0.011			0.784	<0.001	0.012		
PEU4	0.695	<0.001	0.015			0.734	<0.001	0.014		
Attitude Toward Using				0.996	0.600				0.995	0.520
AT1	0.827	<0.001	0.009			0.753	<0.001	0.013		
AT2	0.859	<0.001	0.008			0.769	<0.001	0.012		
AT3	0.846	<0.001	0.009			0.780	<0.001	0.012		
AT4	0.709	<0.001	0.014			0.693	<0.001	0.015		
AT5	0.600	<0.001	0.017			0.593	<0.001	0.018		
Behavioral Intention to Use				0.994	0.633				0.990	0.521
BI1	0.743	<0.001	0.013			0.712	<0.001	0.016		
BI2	0.837	<0.001	0.010			0.766	<0.001	0.015		
BI3	0.804	<0.001	0.011			0.685	<0.001	0.017		

Note: CR = composite reliability; and AVE = average variance extraction.

4.4. Model of Fit of the Statistical Multigroup Analysis Validation

It is important to perform a model validation before interpreting the model results. In general, model fit statistics are used to measure the SEM multigroup accuracy by evaluating the chi-squared test for model fit, with the statistical value obtained from the parameter $\chi 2$ divided by degrees of freedom, indicating that the developed model fitted the empirical data and was statistically significant. In addition, the values for the CFI, RMSEA, TLI, and SRMR were used to evaluate whether the model that was built according to theory fitted with the empirical data or not, as indicated in Section 3.2 [51]. Table 6 represents the details of the estimated comparison parameter between the measurement invariance model and the different characteristics of the individual group models (urban and rural models).

Table 6. Model of fit: statistical and multigroup analysis.

Description	$\chi 2$	df	$\chi 2$/df	CFI	TLI	RMSEA	SRMR	Delta-$\chi 2$	Delta-df	p-Value
Measurement invariance										
Model 1: Simultaneous	4210.897	876	4.807	0.951	0.941	0.049	0.048			
Model 2: Factor loading, intercept, and structural path held equal across the groups	4339.858	901	4.817	0.950	0.941	0.049	0.051	128.961	25	<0.001
Individual group										
Model 1: Urban	2097.765	436	4.811	0.956	0.946	0.049	0.051			
Model 2: Rural	2118.077	437	4.847	0.946	0.935	0.049	0.061			

Note: χ^2 = chi-squared statistics, df = degree of freedom, RMSEA = root mean square error of approximation, SMRM = standardized root mean square residual, TLI = Tucker–Lewis Index, and CFI = comparative fit index.

Table 6 presents the statistical values of Model 1, the simultaneous model, considering the values of $\chi 2$ = 4210.897, df = 876, ($\chi 2$/df = 4.807), CFI = 0.951, TLI = 0.941, RMSEA = 0.049, and SRMR = 0.048. Model 2, considering the factor loading, intercept, and structural path held equal across the groups, had values of $\chi 2$ = 4339.858, df = 901, ($\chi 2$/df = 4.817), CFI = 0.950, TLI = 0.941, RMSEA = 0.049, and SRMR = 0.051. Comparing the models using testing for statistical significance, delta-$\chi 2$ = 128.961 and delta-df = 25, it was found that $p < 0.05$, indicating that the models are different.

For the individual group models (Tables 7 and 8), the urban and rural models, which were created with reference to the theory, featured 33 observed variables, classified as m > 30. In Table 6, regarding the statistical values of Model 1, the urban model values were $\chi 2$ = 2097.765, df = 436, ($\chi 2$/df = 4.811), CFI = 0.956, TLI = 0.946, RMSEA = 0.049, and SRMR = 0.051. The model showed a goodness of fit with the empirical data. In terms of the statistical values of Model 2, the rural model's values were $\chi 2$ = 2097.765, df = 436, ($\chi 2$/df = 4.811), CFI = 0.956, TLI = 0.946, RMSEA = 0.049, and SRMR = 0.051. Thus, the model fitted the empirical data.

Table 7. Measurements of the model parameter's standardized estimate for the technology readiness index (TRI).

Latent Variable/ Observed Variables	Urban				Rural			
	Standardized Estimate	Standard Error	p-Value	R^2	Standardized Estimate	Standard Error	p-Value	R^2
Optimism by								
OP1	0.757	0.012	<0.001	0.574	0.709	0.015	<0.001	0.503
OP2	0.789	0.013	<0.001	0.623	0.763	0.015	<0.001	0.582
OP3	0.837	0.011	<0.001	0.700	0.767	0.014	<0.001	0.588
OP4	0.808	0.011	<0.001	0.652	0.799	0.012	<0.001	0.639
OP5	0.863	0.010	<0.001	0.744	0.836	0.012	<0.001	0.698
Innovativeness by								
IN1	0.803	0.011	<0.001	0.645	0.758	0.013	<0.001	0.575
IN2	0.835	0.009	<0.001	0.697	0.804	0.012	<0.001	0.646
IN3	0.898	0.007	<0.001	0.807	0.864	0.01	<0.001	0.747
IN4	0.852	0.009	<0.001	0.726	0.777	0.012	<0.001	0.603
Discomfort by								
DF1	0.663	0.016	<0.001	0.440	0.738	0.014	<0.001	0.545
DF2	0.730	0.013	<0.001	0.533	0.757	0.013	<0.001	0.573
DF3	0.823	0.011	<0.001	0.678	0.784	0.013	<0.001	0.615
DF4	0.857	0.009	<0.001	0.734	0.824	0.011	<0.001	0.679
DF5	0.820	0.010	<0.001	0.673	0.681	0.016	<0.001	0.464
Insecurity by								
IC1	0.855	0.010	<0.001	0.731	0.860	0.012	<0.001	0.740
IC2	0.755	0.013	<0.001	0.569	0.735	0.015	<0.001	0.540
IC3	0.645	0.017	<0.001	0.416	0.679	0.017	<0.001	0.461
IC4	0.686	0.016	<0.001	0.470	0.702	0.016	<0.001	0.493

Table 8. Measurements of the model parameter's standardized estimate for the technology acceptance model (TAM).

Latent Variable/ Observed Variables	Urban				Rural			
	Standardized Estimate	Standard Error	*p*-Value	R^2	Standardized Estimate	Standard Error	*p*-Value	R^2
Perceived Usefulness by								
PU1	0.719	0.017	<0.001	0.517	0.677	0.019	<0.001	0.459
PU2	0.829	0.012	<0.001	0.687	0.794	0.014	<0.001	0.630
PU3	0.763	0.013	<0.001	0.582	0.727	0.016	<0.001	0.529
Perceived Ease of Use by								
PEU1	0.676	0.015	<0.001	0.457	0.689	0.015	<0.001	0.474
PEU2	0.806	0.011	<0.001	0.650	0.783	0.013	<0.001	0.613
PEU3	0.802	0.011	<0.001	0.644	0.785	0.011	<0.001	0.616
PEU4	0.709	0.015	<0.001	0.502	0.753	0.014	<0.001	0.567
Attitude Toward Using by								
AT1	0.821	0.009	<0.001	0.673	0.755	0.013	<0.001	0.570
AT2	0.861	0.008	<0.001	0.741	0.771	0.012	<0.001	0.595
AT3	0.843	0.009	<0.001	0.711	0.774	0.012	<0.001	0.600
AT4	0.713	0.014	<0.001	0.508	0.696	0.015	<0.001	0.485
AT5	0.606	0.017	<0.001	0.368	0.599	0.018	<0.001	0.359
Behavioral Intention to Use by								
BI1	0.746	0.013	<0.001	0.557	0.729	0.015	<0.001	0.532
BI2	0.845	0.010	<0.001	0.714	0.777	0.014	<0.001	0.604
BI3	0.801	0.011	<0.001	0.642	0.680	0.017	<0.001	0.463

4.5. Model Estimation Analysis Results

This section presents the content and results of the analysis of the impact of the attitudes toward the acceptance of high-speed rail technology of elderly passengers living in both urban and rural areas. All of the observed variables in the two models were significant ($p < 0.001$). For the SEM interpretation, the importance for each observed variable for the latent variable is indicated using the factor loading values for the measurement model. The observed variables were accepted for their importance, which decreased according to the factor loading values, as shown in Tables 7 and 8.

4.5.1. Urban Model

Figure 2 presents the influence of the TRI on PEU and PU under the TAM, including its influence on the internal latent variables of the TAM theory. All of the latent variables of the urban model were significant ($p < 0.001$).

Perceived Ease of Use: Optimism ($\beta = 0.300$) and innovativeness ($\beta = 0.528$) had a positive influence on the PEU of high-speed rail, as measured by OP5 ($\Lambda = 0.863$), the observed variable that indicated the elderly respondents' belief that high-speed rail will make transportation more efficient for the elderly, and IN3 ($\Lambda = 0.898$), the observed variable indicating following updated information related to technology development, while discomfort ($\beta = -0.076$) and insecurity ($\beta = -0.140$) had a negative influence on the PEU of high-speed rail, as measured by DF4 ($\Lambda = 0.857$), where the observed variable indicated that the elderly were worried about the difficulties with respect to traveling to the station, and IC1 ($\Lambda = 0.855$), the observed variable indicating feeling insecure concerning travel by high-speed rail, such as accessing the platforms and buying tickets. Therefore, these findings support H1u, H3u, H5u, and H7u.

Perceived Usefulness: Optimism ($\beta = 0.239$) and innovativeness ($\beta = 0.128$) showed a positive influence on the PU of high-speed rail, as measured by OP5 ($\Lambda = 0.863$), the observed variable that indicated the belief that high-speed rail will make transportation more efficient for the elderly, and IN3 ($\Lambda = 0.898$), the observed variable indicating following updated information related to technology development. Discomfort ($\beta = -0.135$) and

insecurity (β = −0.130) had a negative influence on the PU of high-speed rail, as measured by DF4 (Λ = 0.857), the observed variable indicating worry about the difficulty of traveling to the station, and IC1 (Λ = 0.855), the indicator of feeling insecure concerning high-speed rail travel, such as accessing the platform and buying tickets. In addition, the PEU of high-speed rail (β = 0.480) had a positive influence on their PU, as measured by PEU3 (Λ = −0.806), the variable indicating the opinion that stations and trains have facilities for serving the elderly. These findings support H2u, H4u, H6u, H8u, and H9u.

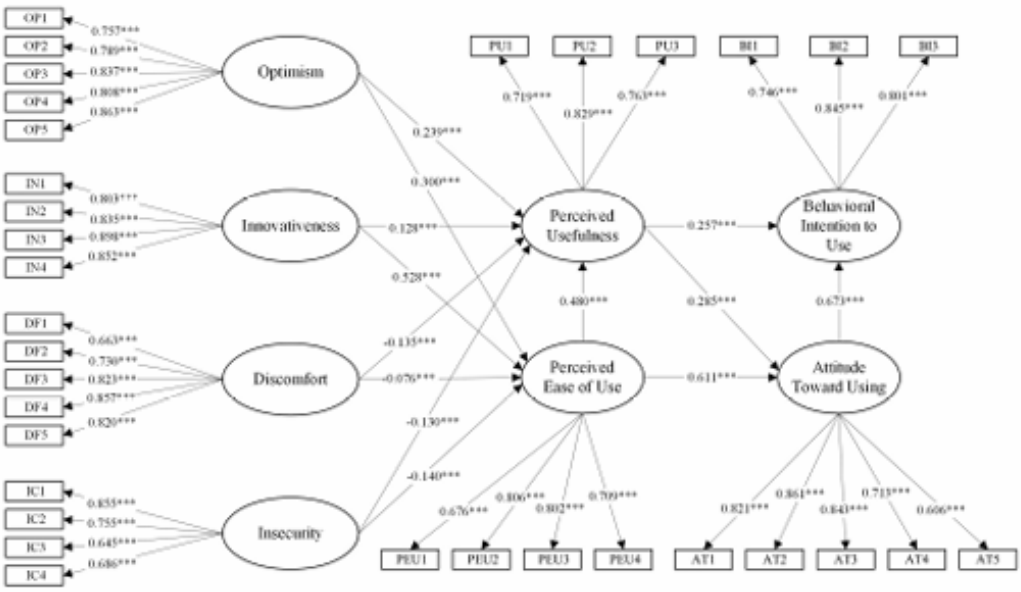

Figure 2. Theory of the technology readiness index and the technology acceptance model for the urban model. Note: standardized coefficients of SEM. *** $p < 0.001$.

Attitude Toward Using: The PEU of high-speed rail (β = 0.611) and the PU of high-speed rail (β = 0.285) had a positive influence on the AT, as measured by PEU3 (Λ = 0.806), the observed variable indicating that the elderly considered that stations and trains have facilities for serving the elderly, and PU2 (Λ = 0.829), indicating that the use of high-speed rail will enhance the ability of the elderly to travel long distances. These findings support H10u and H11u.

Behavioral Intention to Use: Both the PU of high-speed rail use (β = 0.257) and the AT of high-speed rail (β = 0.673) showed a positive influence on the BI high-speed rail, as measured by PU2 (Λ = 0.829), indicating that the use of high-speed rail will enhance the ability to travel long distances, and AT2 (Λ = 0.861), the variable indicating the belief that high-speed rail is the right alternative and an attractive travel mode. These findings support H12u and H13u.

4.5.2. Rural Model

Figure 3 illustrates the influence of the TRI on the PU and PEU of the TAM, including the internal impact on the latent variables of the technology acceptance theory. All of the latent variables in the rural model were significant ($p < 0.001$).

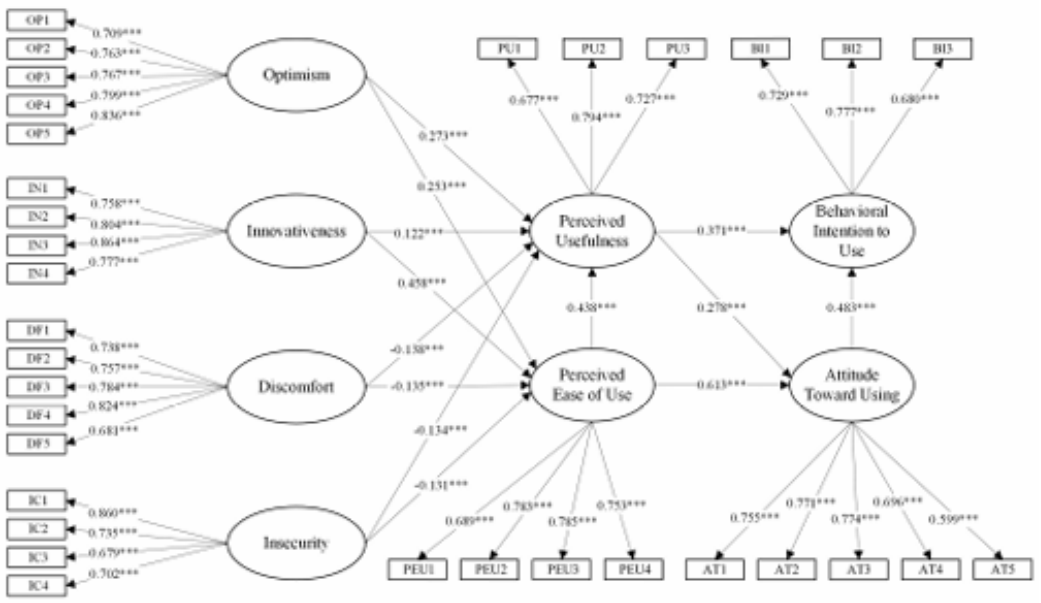

Figure 3. Theory of the technology readiness index and technology acceptance model for rural model. Note: standardized coefficients of SEM. *** $p < 0.001$.

Perceived Ease of Use: Optimism (β = 0.253) and innovativeness (β = 0.458) had a positive influence on the PEU of high-speed rail, as measured by OP5 (Λ = 0.836), the observed variable that indicated the respondents' belief that high-speed rail will make their transportation more efficient, and IN3 (Λ = 0.864), indicating that the elderly tend to follow updated information related to the development of technology. However, discomfort (β = −0.135) and insecurity (β = −0.131) had a negative influence on the PEU of high-speed rail, as measured by DF4 (Λ = 0.824), indicating that the elderly were concerned about the difficulty of traveling to stations. In addition, the value for IC1 (Λ = 0.860) indicated that the elderly felt insecure regarding processes regarding high-speed rail, such as accessing platforms and buying tickets. These findings supported H1r, H3r, H5r, and H7r.

Perceived Usefulness: Optimism (β = 0.273) and innovativeness (β = 0.122) had a positive influence on the PU of high-speed rail, as measured by OP5 (Λ = 0.836), and the observed variable indicated that the elderly believe that high-speed rail will make transportation more efficient for the elderly, and IN3 (Λ = 0.864) indicated that the elderly follow updated information related to technology development. By contrast, discomfort (β = −0.138) and insecurity (β = −0.134) had a negative influence on the PU of high-speed rail, as measured by DF4 (Λ = 0.824), the observed variable that indicated that the elderly were worried about their difficulties traveling to the station, and IC1 (Λ = 0.860), indicating that the elderly felt insecure about the processes of riding high-speed rail, such as accessing platforms and buying tickets. In addition, the PEU of high-speed rail (β = 0.438) showed a positive influence on the PU of high-speed rail, as measured by PEU3 (Λ = 0.785), the variable indicating that the respondents considered whether the stations and trains had facilities for serving the elderly. Thus, these findings support the hypotheses H2r, H4r, H6r, H8r, and H9r.

Attitude Toward Using: This was positively influenced by both the PEU (β = 0.613) and PU (β = 0.278), as measured by the observed variable PEU3 (Λ = 0.785), the observed variable that indicated that the elderly considered that stations and trains have facilities for serving the elderly, and PU2 (Λ = 0.794), the observed variable indicating that the use

of high-speed rail will enhance the ability of the elderly to travel long distances. These findings support hypotheses H10r and H11r.

Behavioral Intention to Use: This was positively influenced by both the PU ($\beta = 0.371$) and the AT of high-speed rail ($\beta = 0.483$), as measured by PU2 ($\Lambda = 0.794$), the observed variable indicating that the use of high-speed rail will enhance the ability of the elderly to travel long distances, and AT3 ($\Lambda = 0.774$), the observed variable that indicated that the elderly believe that using high-speed rail will reduce traveling problems. Thus, these findings support hypotheses H12r and H13r.

5. Discussion

5.1. Theory

This part discusses the differences in technology acceptance attitudes between elderly passengers in urban and rural areas toward high-speed rail and provides policy recommendations for its promotion in the future [5,7] for the following latent variables:

Behavioral Intention to Use: Section 4.5 shows that the urban elderly group exhibits an intention to use high-speed rail due to their positive AT of high-speed rail rather than the PU. In addition, both of these factors are positive influences. The results are similar to the findings that indicated that the attitude toward m-health significantly influenced the intention to use m-health [20]. In addition, Chen and Chan [47] stated that the PU and AT had a positive impact on the usage behavior among the elderly. Thus, when individuals perceive the usefulness of technology and have a positive AT, they tend to show greater involvement in its actual use. These results are consistent with those of the rural elderly group, indicating that their intention to use high-speed rail resulted from a positive AT for high-speed rail rather than the PU of high-speed rail technology. This finding is similar to that of Mitzner and Boron [18], who found that elderly adults had a more positive AT than a negative AT, indicating a perception that benefits outweigh the costs in using technology. Additionally, Kim and Chow [21] discovered that attitudes toward the use of digital health technology (DHT) influenced continued usage intentions; however, this finding was different from that of Classen and Mason's study [34], showing that PEU had no significant influence on the intention to use autonomous vehicle systems among elderly passengers. Thus, the draft of a policy plan to make elderly passengers interested in using high-speed rail technology to meet their needs should focus on making them develop a positive AT of high-speed rail. For example, Dash and Mohanty [20], who tailored m-health applications to meet the specific needs and preferences of elderly users, showed increased collaboration with and support for these technologies, which should be followed in the policies that create the PU of high-speed rail technology in elderly passengers, such as [33], who developed an educational campaign to increase the PU and security of mobile payment systems, or [18], who implemented educational and training programs to emphasize the use of technology to increase future rates of acceptance.

Attitude Toward Using: The AT of high-speed rail among the urban elderly is more influenced by the PEU of high-speed rail than the PU of its technology, and both factors were positive influences. The results of this study are consistent with the following findings: the PEU and PU positively influenced the elderly's attitudes toward m-health [20], in addition to Chen and Chan [47], who found that both the PU and PEU had a positive influence on elderly passengers' AT, indicating that when they perceived its usefulness and ease of use, a positive AT increased. The results for the urban elderly group were evidently consistent with those of the rural elderly group, showing the AT of high-speed rail among the urban elderly was more influenced by the PEU of high-speed rail than the PU of using its technology. The findings of this study recall those of [18], who found that positive attitudes were closely linked to the ways in which technology supported activities, enhanced convenience, and contained useful features, along with research by [21,43,45] that indicated that PU and PEU positively impacted elderly individuals' attitudes and intentions to use technology in the healthcare setting. It is clear that the appropriate policy for both areas is to create a greater PEU of high-speed rail among elderly passengers to

create a more positive attitude toward the use of high-speed rail among elderly passengers. Dash and Mohanty [20] suggested a means of enhancing TR in the elderly population by focusing on factors such as PU and PEU that influence their attitude toward m-health. Similarly, Akritidi and Gallos [43] focused on developing the PU and PEU of digital for the promotion of health service applications. Additionally, Blut and Wang [35] emphasized the importance of constant support for facilitating the positive impact of incentives on perceptions and the use of technology.

Perceived Usefulness: The PU of high-speed rail use among the urban elderly was most influenced by its PEU. This finding echoes that of Chen and Chan [47], who found that the PEU positively affects the PU, suggesting that when individuals perceive that a technology is effortless to use, they tend to recognize its value for enhancing their daily lives, followed by improved optimism and innovativeness, and all three factors mentioned showed positive influences. These results are similar to those found in previous studies, showing that optimism and innovativeness had significant impacts on PU [20]. Rebsamen and Knols [19] discovered that self-efficacy in gerontechnology has a positive impact on PU in elderly adults. Insecurity and discomfort had negative effects on the PU of using high-speed rail in elderly adults. The results of this study are similar to those found in previous studies showing that gerontechnology anxiety and health conditions tend to have a negative influence on PU in the context of technology acceptance by elderly individuals [47]. Dash and Mohanty [20] found that insecurity negatively impacts PU, while discomfort does not affect it. The results are different from those of the urban group, which is in line with the rural elderly group, as the urban elderly group's PU of high-speed rail use was most positively influenced by its PEU. These findings are similar to those of Makkonen and Frank [36], who discovered that the effects of PEU on PU were both positive and statistically significant, and of Kim and Chow [21], who found that PEU had a positive impact on PU. This positive correlation indicated that when the elderly had a PEU for digital health technology (DHT), they tended to believe that the use of the mentioned technology would enhance their own health, followed by improved optimism and innovativeness. All three factors noted are positive influences. Earlier results showed that innovativeness and optimism positively influenced the perception of technology and use, indicating a direct relationship between the positive variables and TR [35]. In addition, the results of [21] indicated that optimism has a tendency toward the PU of DHT and its PEU. Makkonen and Frank [36] discovered that optimism had a positive influence on PU, but innovativeness had a negative one, contrasting with the results of this study. Insecurity and discomfort had a negative influence on the PU of high-speed rail use in the elderly. This finding forms a contrast with that of Blut and Wang [35], who found that insecurity and discomfort did not significantly affect the use of technology, indicating that negative variables might not significantly affect TR. As with [47], the obtained results suggest more PEU for high-speed rail among elderly passengers, as well as policies to promote the AT, followed by a second factor, creating optimism and innovativeness, such as, for example, policies focused on enhancing motivators such as innovativeness and optimism in individuals to promote the adoption and use of technology [35]. Furthermore, reducing insecurity and discomfort should help elderly adults perceive greater benefits from using high-speed rail, similar to the results found by Classen and Mason [34], who showed that elderly drivers who had training programs had increased confidence and safety in the use of autonomous shuttles. This could further increase acceptance rates. Makkonen and Frank [36] developed specific strategies for dealing with the discomfort associated with technology use among the elderly.

Perceived Ease of Use: The PEU of high-speed rail among the urban elderly is most strongly influenced by innovativeness, followed by optimism. Both factors had positive influences. These results are similar to those of the previous research, as stated in the following quotation: "Technology makes me more efficient in my occupation; I can usually figure out new high-tech products and services without help from others, and they have a positive influence on adoption readiness" [33]. In addition, the results of Dash and

Mohanty [20] found that optimism and innovativeness show significant effects on PEU in terms of discomfort. Insecurity tends to have a negative influence on perceived ease of high-speed rail. These results are similar to this study, finding that insecurity and discomfort negatively impact PEU [20]. The elderly group in urban areas in this study showed results consistent with those of the rural elderly group, in that they showed a PEU of high-speed rail. The urban elderly were the most influenced by innovativeness, followed by optimism, and both factors were positive influences. The results of this study are similar to those of Kim and Chow [21], who found that optimism and innovativeness are positively connected to PEU, and those of Makkonen and Frank [36]. TR constructs such as optimism and innovativeness tend to have a positive influence on PEU. With respect to discomfort, insecurity is a negative influence on the PEU of high-speed rail. This finding is relevant to the following research findings: those of Mitzner and Boron [18], who found that negative attitudes are associated with inconvenience, unhelpful features, and security and reliability concerns; [36], who found that discomfort had a negative influence on PEU; and the results of Kim and Chow [21]. However, insecurity did not exhibit a significant influence. The policy developed from this result is that the technological innovation of high-speed rail should be publicized to make the elderly aware that high-speed rail technology is an innovation to make traveling more convenient for the elderly. To increase technology knowledge among the elderly, it is necessary to identify the different levels of familiarity with technology in urban and rural areas [46] or to develop positive attitudes toward aging and life satisfaction, promoting the use of technology among the elderly [47]. Another factor that can help the elderly perceive the ease of using high-speed rail is reducing their feelings of insecurity and inconvenience with reference to high-speed rail technology. For example, research by Dash and Mohanty [20] presented an educational program to address the discomfort that is associated with the use of technology. This would take into account the impact on the perception of ease of use of m-health applications in setting policies to create an environment conducive to acceptance and building trust in technology [33].

5.2. Urban and Rural Society

The results of this multigroup analysis based on the TRI and TAM found that elderly people living in urban and rural areas exhibit different levels of technology acceptance with respect to high-speed rail, in particular in attitudes toward using high-speed rail. Attitude toward using has a positive influence on the behavioral intention to use of the urban elderly more than the rural elderly, followed by optimism, which has a positive influence on perceived ease of use, and perceived ease of use, which has a positive influence on perceived usefulness. Discomfort is a factor, which has a negative influence on perceived ease of use, which the rural elderly have more than the urban elderly. The reasons for this may be the readiness and ability to access technology infrastructure [17], as well as differing levels of social support and learning [47]. This indicates that the rural elderly in Thailand have less experience with technology use than the urban elderly [30]. These results are similar to the results of the study by Puri and Kim [46], which found that access to resources, social influence, and PU tend to encourage technology acceptance in elderly adults in urban areas. By contrast, limited resources, lower social interaction, and privacy concerns may hinder the adoption of technology among elderly adults in nonurban or suburban locations. Conversely, perceived usefulness had a positive influence on behavioral intention to use, and optimism had a positive influence on perceived usefulness among the rural elderly more than the urban elderly, indicating that the rural elderly in Thailand viewed high-speed rail technology as beneficial for their travel. These results suggest that it is necessary to enhance the experience of technology use among the rural elderly and to create awareness of the benefits of high-speed rail technology among the urban elderly to increase the acceptance of high-speed rail technology in both groups. In addition to this result, a study using multigroup analysis to measure attitudes in urban and rural areas found that the two groups are different. For example, a study of students' intentions to use helmets in urban and rural areas in Thailand used the theory of planned behavior and control beliefs [27].

A study of the intention to wear face masks and the differences in preventive behaviors between urban and rural areas in response to COVID-19 performed an analysis based on the TAM [28], and a study was conducted regarding whether financial technology improves the intention to pay zakat during national economic recovery [29]. These findings confirm different attitudes in different populations affecting technology acceptance. The authors of [21] suggested that assistance and guidance be provided to bridge the technological gap that relates to aging to make it easier for the elderly to access technology, including the provision of social support for the use of technology.

6. Conclusions and Implementations

This study investigated the differences in attitude between urban and rural elderly passengers affecting high-speed rail technology acceptance, using the TRI [22,23] and TAM [24,25]. Both theories have been used to study technology acceptance in various fields [20,21], including the acceptance of high-speed rail technology. As Thailand faces a transition to a fully aged society, the government must develop policies to protect and support the elderly, including facilitating their travel. The high-speed rail project that is currently being developed will help increase the convenience of travel for the elderly [8–10]. In the statistical analysis of the results, the SEM was used to analyze the urban and rural elderly samples, testing the differences between the urban and rural models, using a multigroup SEM for the comparison of the parameter estimations. An overview of the statistical indicators found that the models were consistent with the empirical data, and the urban and rural models were significantly different.

The main research findings comparing urban and rural residents were as follows. The factors from the TRI theory of innovativeness had the greatest effect on the PEU of high-speed rail use. Thus, the PEU of high-speed rail use has the greatest influence on the PU of high-speed rail and the AT of high-speed rail in both groups. This study supports the idea that seniors' PEU of technology is important, as the usefulness of this technology depends on the willingness to use it. Positive attitudes toward using technology were influenced by both the PEU and PU, highlighting the importance of considering these factors in encouraging technology in this population [21]. Both the AT and PU had a positive effect on the intention to use high-speed rail. Therefore, both urban and rural groups showed the same results. However, certain significant differences arose in the parameters. Particularly, the attitudes toward using high-speed rail technology were clearly higher in urban areas than outside them. Conversely, the PU of high-speed rail technology in rural areas was greater than in urban areas.

The policies or strategies recommended for the two groups differ according to the results, as follows. To increase the intention to use high-speed rail, urban areas should focus on enabling the urban elderly with positive attitudes toward using, while, in rural areas, it is necessary to promote positive attitudes toward using for high-speed rail, along with policies to enhance its PU. Policies enhancing elderly passengers' recognition of the benefits and convenience of using high-speed rail technology should be promoted. Furthermore, it is indispensable to reduce discomfort and insecurity. This will promote the PU and ease of high-speed rail technology use, leading to positive attitudes toward using high-speed rail for the elderly and their intentions to use it.

To guide policy development to foster positive attitudes toward using high-speed rail among the urban elderly, awareness should be raised of high-speed rail travel as a suitable mode of transportation for urban residents to attract more elderly passengers. By contrast, in rural areas, the focus should be on addressing travel challenges. This can be performed through initiatives including the organization of high-speed rail tours to provide real-life experiences, including special discounts, and hosting technological and innovative exhibitions that relate to high-speed rail to build confidence and produce a positive impression for the elderly. This can be achieved by organizing an activity like the High-Speed Rail Tour, allowing participants to experience actual high-speed rail services, along with the introduction of technology and various facilities on the trains. Examples of

previous activities include a lecture on Basic Rights that the Elderly Must Know held at the Thailand Health Care 2024 Retirement Club Event; special lectures on further expanding the results of the Digital Elderly course; and activities that use the power of the elderly in driving a more social society, along with the Center for Quality-of-Life Development and Career Promotion for the Elderly (the Centers), China, and the activity Create Happiness for the development of the elderly [67]. These policies will encourage elderly individuals to perceive high-speed rail as a suitable and appealing travel option tailored to their needs, so that they believe that utilizing high-speed rail services can effectively alleviate the common travel challenges faced by older adults, offering a more convenient and reliable mode of transportation.

Polices enhancing the PU of high-speed rail use both within and outside urban areas can be implemented by providing the elderly with information on high-speed rail technology, enhancing their abilities to travel long distances, including arranging community seminars to introduce the use of high-speed rail, distributing documents and public relations materials to explain the advantages of the use of high-speed rail, and giving advice and assistance for booking tickets and travel. Communities can be provided with information on the benefits of high-speed rail, informing them, for example, that high-speed rail helps increase comfort and safety over long journeys. Past activities include group discussions on the topic of the rights and welfare of the elderly in a seminar on Elderly Welfare toward a Sustainable Future; another on Create Happiness, Aging Society, and Confidence: Ready to Cope with an Aging Society; and a third on Create Happiness, Confidence, and Ready for an Aging Society [67]. These policies are expected to encourage elderly individuals to perceive that using high-speed rail will enhance their ability to travel long distances with greater ease and convenience.

With respect to the PEU of high-speed rail both in urban and rural areas, the focus should be on providing information using printed materials, outlining the facilities for elderly passengers at high-speed rail stations and on trains, as well as through electronic media (video, audio, and various online media), or through developing a detailed manual on the use of high-speed rail for the elderly, including details on the facilities; disseminating online articles; and publishing social media posts highlighting the convenience of using services, such as the facilities for the elderly on high-speed rail. These could be distributed through various websites and social media, and activities could be organized for actual use by the elderly, such as with the use of elevators and escalators at stations, using bathrooms on the train, and accessing platforms. Examples of similar manuals would include guidelines for requesting services, such as the Elderly Social Welfare Development Center, the Elderly School Manual, and the Manual for Preparing Elderly Community Enterprises for Online Trading [68]. These policies will encourage elderly individuals to perceive learning to use high-speed rail for travel as an easy and accessible process. It also seeks to promote the belief that stations and trains are well equipped with facilities specifically designed to accommodate the needs of older adults.

The policy of improving the perception of high-speed rail innovativeness has led to an optimism toward high-speed rail among elderly individuals to stay informed about technological advancements and to foster the belief that high-speed rail will improve the efficiency of their transportation options through multiple media channels, including disseminating information on the innovation and safety of high-speed rail in print media; creating videos demonstrating the convenience of using high-speed rail, including a public video presentation entitled "Innovation and safety of high-speed rail for the elderly"; and distributing them through online channels, such as YouTube and various types of social media. Such seminars can be simultaneously organized in the community to directly deliver additional information. Examples of involved media under the following topics were The Elderly with Technology Use, Aging Society and Financial Services in the Digital Age, the Project of Expanding the Elderly's Use of Technology and Innovation, and Innovations for the Actual Use by the Elderly [69]. In addition to the policies aimed at raising awareness of the benefits of using high-speed rail technology, public transportation should

be provided from community centers in rural areas to the station. Both stations and trains must offer comprehensive facilities for seniors throughout the journey, including restrooms equipped with small grab bars to assist elderly passengers. Additionally, incentives such as discounted fares for senior passengers or group travel promotions can further encourage the elderly to use the service. Having trained staff available to assist elderly passengers with various high-speed rail travel procedures, such as accessing platforms or purchasing tickets, can greatly alleviate concerns about receiving prompt assistance in the event of an emergency during the journey, such as a medical emergency or a security issue like theft. This is particularly important for elderly individuals living in urban areas, who may be especially concerned about safety and security. In addition, such policies will also help reduce discomfort and insecurity, which are significant obstacles to elderly passengers for the PU and PEU of high-speed rail technology.

With the projected increase in the elderly population, a corresponding rise in the number of older adults who are either unable to drive or live independently is anticipated. This demographic will likely face significant barriers in accessing transportation services. Therefore, it is imperative to develop a deeper understanding of the unique needs and preferences of older adults to create transportation systems that are better equipped to serve them. Designing systems that cater specifically to this group will also be critical in attracting elderly users, who are expected to form a significant portion of future high-speed rail demand. Policy recommendations arising from this research can be effectively implemented through coordinated efforts among the relevant agencies. Engaging in discussions and collaborations with stakeholders will facilitate the creation of a shared vision and comprehensive guidelines for policy development, ensuring that the transportation needs of the elderly population are adequately addressed in the context of high-speed rail technology.

7. Limitations and Future Research

While this study provides profoundly valuable insights, several limitations should be addressed in future research. The sample of urban and rural residents living along high-speed rail lines may not be representative of the entire elderly population. Future studies should include a more diverse and larger sample to increase generalizability. Further, longer term studies are indispensable to examine the changes in attitudes and acceptance over time as high-speed rail technology evolves. The investigation of other factors, such as cultural influences and economic and social status, may enhance the understanding of technology acceptance among elderly groups.

Author Contributions: Conceptualization, methodology, data curation, formal analysis, and writing—original draft preparation, A.D.; conceptualization, methodology, data curation, and writing—original draft preparation, F.W.; validation and writing—review and editing, T.C.; validation and software, S.J.; validation analysis, P.W.; formal analysis, T.P.; and software and supervision, V.R. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Suranaree University of Technology (SUT), the Thailand Science Research and Innovation (TSRI), and the National Science, Research and Innovation Fund (NSRF) (project code: 195602).

Informed Consent Statement: This study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of the Suranaree University of Technology (COE No.2/2567, 15 December 2023).

Data Availability Statement: The data are available on request due to privacy restrictions.

Acknowledgments: The authors express their gratitude to the Suranaree University of Technology (SUT), the Thailand Science Research and Innovation (TSRI), and the National Science, Research and Innovation Fund for their support in undertaking this research.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Department of Older Persons (Department of Older Persons-Ministry of Social Development and Human Security). *Current Aging Society and Economy in Thailand*; Department of Older Persons-Ministry of Social Development and Human Security: Bangkok, Thailand, 2024.
2. Department of Provincial Administration (Department of Provincial Administration-Ministry of Interior). *Elderly Statistics Report April 2024*; Department of Provincial Administration-Ministry of Interior: Bangkok, Thailand, 2024.
3. Ministry of Social Development and Human Security (Social Policy Development and Innovation Division-Ministry of Social Development and Human Security). *Office of the National Economic and Social Development Council. Population Estimates for Thailand, Revised Edition 2010—2040.*; Social Policy Development and Innovation Division-Ministry of Social Development and Human Security: Bangkok, Thailand, 2020.
4. Office of the Council of State. *Elderly Act 2003 Amended Version*; Office of the Council of State: Bangkok, Thailand, 2003.
5. Royal Thai Government (Economic Aspect-Royal Thai Government). *31st Meeting of the Joint Committee for Railway Cooperation between Thailand and China*; Economic Aspect-Royal Thai Government: Bangkok, Thailand, 2024.
6. Ministry of Transport (Ministry of Transport). *20-Year Strategy for Developing Thailand's Transportation System (2018–2037)*; Ministry of Transport: Singapore, 2019.
7. The Office of Transport and Traffic Policy and Planning (The Office of Transport and Traffic Policy and Planning). *Master Plan Document for Railway Network Development Support Special Economic Zones Travel and Area Development*; The Office of Transport and Traffic Policy and Planning: Bangkok, Thailand, 2018.
8. Tang, J.; Zhen, F.; Cao, J.; Mokhtarian, P.L. How do passengers use travel time? A case study of Shanghai–Nanjing high speed rail. *Transportation* **2018**, *45*, 451–477. [CrossRef]
9. Lee, W.-H.; Yen, L.-H.; Chou, C.-M. A delay root cause discovery and timetable adjustment model for enhancing the punctuality of railway services. *Transp. Res. Part C Emerg. Technol.* **2016**, *73*, 49–64. [CrossRef]
10. Kamga, C. Emerging travel trends, high-speed rail, and the public reinvention of US transportation. *Transp. Policy* **2015**, *37*, 111–120. [CrossRef]
11. Dobruszkes, F.; Chen, C.-L.; Moyano, A.; Pagliara, F.; Endemann, P. Is high-speed rail socially exclusive? An evidence-based worldwide analysis. *Travel Behav. Soc.* **2022**, *26*, 96–107. [CrossRef]
12. Saeidi, S.; Enjedani, S.; Behineh, E.A.; Tehranian, K.; Jazayerifar, S. Factors affecting public transportation use during pandemic: An integrated approach of technology acceptance model and theory of planned behavior. *Teh. Glas.* **2023**, *18*, 342–353. [CrossRef]
13. JEN, W.; LU, M.L.; WANG, W.-T.; CHANG, Y.-T. Effects of perceived benefits and perceived costs on passenger's intention to use self-ticketing kiosk of Taiwan high speed rail corporation. *J. East. Asia Soc. Transp. Stud.* **2013**, *10*, 215–230.
14. Borhan, M.N.; Ibrahim, A.N.H.; Miskeen, M.A.A. Extending the theory of planned behaviour to predict the intention to take the new high-speed rail for intercity travel in Libya: Assessment of the influence of novelty seeking, trust and external influence. *Transp. Res. Part A Policy Pract.* **2019**, *130*, 373–384. [CrossRef]
15. Rahimi, B.; Nadri, H.; Afshar, H.L.; Timpka, T. A systematic review of the technology acceptance model in health informatics. *Appl. Clin. Inform.* **2018**, *9*, 604–634. [CrossRef]
16. Xie, J.; Zhan, S.; Wong, S.; Wen, K.; Qiang, L.; Lo, S. High-speed rail services for elderly passengers: Ticket-booking patterns and policy implications. *Transp. Policy* **2022**, *125*, 96–106. [CrossRef]
17. Kuo, C.W.; Tang, M.L. Relationships among service quality, corporate image, customer satisfaction, and behavioral intention for the elderly in high speed rail services. *J. Adv. Transp.* **2013**, *47*, 512–525. [CrossRef]
18. Mitzner, T.L.; Boron, J.B.; Fausset, C.B.; Adams, A.E.; Charness, N.; Czaja, S.J.; Dijkstra, K.; Fisk, A.D.; Rogers, W.A.; Sharit, J. Older adults talk technology: Technology usage and attitudes. *Comput. Hum. Behav.* **2010**, *26*, 1710–1721. [CrossRef] [PubMed]
19. Rebsamen, S.; Knols, R.H.; Pfister, P.B.; De Bruin, E.D. Exergame-driven high-intensity interval training in untrained community dwelling older adults: A formative one group quasi-experimental feasibility trial. *Front. Physiol.* **2019**, *10*, 449529. [CrossRef]
20. Dash, A.; Mohanty, S.K. Technology readiness and the older citizen's acceptance of m-health services in India. *Digit. Policy Regul. Gov.* **2023**, *25*, 169–183. [CrossRef]
21. Kim, S.; Chow, B.C.; Park, S.; Liu, H. The usage of digital health technology among older adults in Hong Kong and the role of technology readiness and eHealth literacy: Path analysis. *J. Med. Internet Res.* **2023**, *25*, e41915. [CrossRef] [PubMed]
22. Parasuraman, A. Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. *J. Serv. Res.* **2000**, *2*, 307–320. [CrossRef]
23. Parasuraman, A.; Colby, C.L. An updated and streamlined technology readiness index: TRI 2.0. *J. Serv. Res.* **2015**, *18*, 59–74. [CrossRef]
24. Davis, F.D. Technology acceptance model: TAM. *Al-Suqri MN Al-Aufi AS Inf. Seek. Behav. Technol. Adopt.* **1989**, *205*, 219.
25. Marangunić, N.; Granić, A. Technology acceptance model: A literature review from 1986 to 2013. *Univers. Access Inf. Soc.* **2015**, *14*, 81–95. [CrossRef]
26. de Gómez, W.; Bullock, R. Civil society in Canada: A case study of rural and urban planning contexts. *Soc. Sci. J.* **2012**, *49*, 202–209. [CrossRef]
27. Champahom, T.; Jomnonkwao, S.; Satiennam, T.; Suesat, N.; Ratanavaraha, V. Modeling of safety helmet use intention among students in urban and rural Thailand based on the theory of planned behavior and Locus of Control. *Soc. Sci. J.* **2020**, *57*, 508–529. [CrossRef]

28. Zhang, B.; Li, Z.; Jiang, L. The intentions to wear face masks and the differences in preventive behaviors between urban and rural areas during COVID-19: An analysis based on the technology acceptance model. *Int. J. Environ. Res. Public Health* **2021**, *18*, 9988. [CrossRef] [PubMed]
29. Mutmainah, L.I.; Berakon, I.; Yusfiarto, R. Does financial technology improve intention to pay zakat during national economic recovery? A multi-group analysis. *J. Islam. Mark.* **2024**, *15*, 1583–1607. [CrossRef]
30. Institute for Population and Social Research (Mahidol University). *Situation of The Thai Older Persons 2021*; Mahidol University: Nakhon Pathom, Thailand, 2022.
31. Mattson, J. Transportation, distance, and health care utilization for older adults in rural and small urban areas. *Transp. Res. Rec.* **2011**, *2265*, 192–199. [CrossRef]
32. Erdoğmuş, N.; Esen, M. An investigation of the effects of technology readiness on technology acceptance in e-HRM. *Procedia-Soc. Behav. Sci.* **2011**, *24*, 487–495. [CrossRef]
33. Sinha, M.; Majra, H.; Hutchins, J.; Saxena, R. Mobile payments in India: The privacy factor. *Int. J. Bank Mark.* **2019**, *37*, 192–209. [CrossRef]
34. Classen, S.; Mason, J.R.; Hwangbo, S.W.; Sisiopiku, V. Predicting autonomous shuttle acceptance in older drivers based on technology readiness/use/barriers, life space, driving habits, and cognition. *Front. Neurol.* **2021**, *12*, 798762. [CrossRef]
35. Blut, M.; Wang, C. Technology readiness: A meta-analysis of conceptualizations of the construct and its impact on technology usage. *J. Acad. Mark. Sci.* **2020**, *48*, 649–669. [CrossRef]
36. Makkonen, M.; Frank, L.; Koivisto, K. Age differences in technology readiness and its effects on information system acceptance and use: The case of online electricity services in Finland. In Proceedings of the Bled eConference, Bled, Slovenia, 18–21 June 2017; University of Maribor Press: Maribor, Slovenia, 2017.
37. Moxley, J.; Czaja, S. The factors influencing older adults' decisions surrounding adoption of technology: Quantitative experimental study. *Jmir Aging* **2022**, *5*, e39890. [CrossRef]
38. Fishbein, M.; Ajzen, I. *Belief, Attitude, Intentions and Behaviour: An Introduction to Theory and Research*; Addison-Wesley: Boston, MA, USA, 1975.
39. Davis, F.D.; Bagozzi, R.P.; Warshaw, P.R. User acceptance of computer technology: A comparison of two theoretical models. *Manag. Sci.* **1989**, *35*, 982–1003. [CrossRef]
40. Li, Y.; Qi, J.; Shu, H. Review of Relationships Among Variables in TAM. *Tsinghua Sci. Technol.* **2008**, *13*, 273–278. [CrossRef]
41. Ammenwerth, E. Technology acceptance models in health informatics: TAM and UTAUT. *Stud. Health Technol. Inf.* **2019**, *263*, 64–71.
42. Guner, H.; Acarturk, C. The use and acceptance of ICT by senior citizens: A comparison of technology acceptance model (TAM) for elderly and young adults. *Univers. Access Inf. Soc.* **2020**, *19*, 311–330. [CrossRef]
43. Akritidi, D.; Gallos, P.; Koufi, V.; Malamateniou, F. Using an Extended Technology Acceptance Model to Evaluate Digital Health Services. *Stud. Health Technol. Inf.* **2022**, *295*, 530–533.
44. Davis, F.D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* **1989**, *13*, 319–340. [CrossRef]
45. Kim, S.D. Application and Challenges of the Technology Acceptance Model in Elderly Healthcare: Insights from ChatGPT. *Technologies* **2024**, *12*, 68. [CrossRef]
46. Puri, A.; Kim, B.; Nguyen, O.; Stolee, P.; Tung, J.; Lee, J. User acceptance of wrist-worn activity trackers among community-dwelling older adults: Mixed method study. *JMIR Mhealth Uhealth* **2017**, *5*, e8211. [CrossRef] [PubMed]
47. Chen, K.; Chan, A.H.S. Gerontechnology acceptance by elderly Hong Kong Chinese: A senior technology acceptance model (STAM). *Ergonomics* **2014**, *57*, 635–652. [CrossRef]
48. Gilbert, C.N.; Ricketts, K.G. Children's attitudes toward older adults and aging: A synthesis of research. *Educ. Gerontol.* **2008**, *34*, 570–586. [CrossRef]
49. De Oña, J.; Mujalli, R.O.; Calvo, F.J. Analysis of traffic accident injury severity on Spanish rural highways using Bayesian networks. *Accid. Anal. Prev.* **2011**, *43*, 402–411. [CrossRef]
50. Ministry of Interior (National and Regional Planning Bureau-Department of Public Works and Town & Country Planning-Ministry of Interior). *National and Regional Policy Planning—Draft Urban and Rural Development Policies*; National and Regional Planning Bureau-Department of Public Works and Town & Country Planning-Ministry of Interior: Bangkok, Thailand, 2023.
51. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 7th ed.; Prentice Hall: Hoboken, NJ, USA, 2010; Volume 7, pp. 77–95.
52. Sarmento, R.P.; Costa, V. Confirmatory factor analysis—A case study. *arXiv* **2019**, arXiv:1905.05598.
53. Awang, Z.; Afthanorhan, A.; Mohamad, M.; Asri, M. An evaluation of measurement model for medical tourism research: The confirmatory factor analysis approach. *Int. J. Tour. Policy* **2015**, *6*, 29–45. [CrossRef]
54. Hooper, D.; Coughlan, J.; Mullen, M.; Hooper, D. Structural equation modelling: Guidelines for determining model fit. *Electron. J. Bus. Res. Methods* **2008**, *6*, 53–60.
55. Tabachnick, B.G.; Fidell, L.S. *Using Multivariate Statistics: International Edition*; Pearson Education: Bangkok, Thailand, 2013.
56. Hu, L.; Bentler, P.M. Structural Equation Modeling: A Multidisciplinary Journal Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Model.* **1999**, *6*, 37–41. [CrossRef]

57. Kim, H.; Ku, B.; Kim, J.Y.; Park, Y.-J.; Park, Y.-B. Confirmatory and exploratory factor analysis for validating the phlegm pattern questionnaire for healthy subjects. *Evid.-Based Complement. Altern. Med.* **2016**, *2016*, 2696019. [CrossRef]
58. Fornell, C.; Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* **1981**, *18*, 39–50. [CrossRef]
59. Meredith, W. Measurement invariance, factor analysis and factorial invariance. *Psychometrika* **1993**, *58*, 525–543. [CrossRef]
60. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis: Global Edition*; Pearson Higher Education: Upper Saddle River, NJ, USA, 2010.
61. Champahom, T.; Jomnonkwao, S.; Thotongkam, W.; Jongkol, P.; Rodpon, P.; Ratanavaraha, V. Investigating Parents' Attitudes towards the Use of Child Restraint Systems by Comparing Non-Users and User Parents. *Sustainability* **2023**, *15*, 2896. [CrossRef]
62. Hoyle, R.H. The structural equation modeling approach: Basic concepts and fundamental issues. In *Structural Equation Modeling: Concepts, Issues, and Application/Sage*; SAGE Publication, Inc.: Thousand Oaks, CA, USA, 1995.
63. Kline, R.B. *Principles and Practice of Structural Equation Modeling*; Guilford Publications: New York, NY, USA, 2023.
64. Ryu, E. Effects of skewness and kurtosis on normal-theory based maximum likelihood test statistic in multilevel structural equation modeling. *Behav. Res. Methods* **2011**, *43*, 1066–1074. [CrossRef]
65. Curran, P.J.; West, S.G.; Finch, J.F. The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychol. Methods* **1996**, *1*, 16. [CrossRef]
66. Shelby, L.B. Beyond Cronbach's alpha: Considering confirmatory factor analysis and segmentation. *Hum. Dimens. Wildl.* **2011**, *16*, 142–148. [CrossRef]
67. Department of Older Persons (News from the Department of Elderly Affairs-Department of Older Persons). *News from the Department of Elderly Affairs*; News from the Department of Elderly Affairs-Department of Older Persons: Bangkok, Thailand, 2024.
68. Department of Older Persons (Citizen's Guide-Department of Older Persons). *Citizen's Guide*; Citizen's Guide-Department of Older Persons: Bangkok, Thailand, 2024.
69. Department of Older Persons (Innovation news for the elderly-Department of Older Persons). *Innovation News for the Elderly*; Innovation News for the Elderly-Department of Older Persons: Bangkok, Thailand, 2024.