



# An Instrument for Measuring Receptiveness to Technology-Based Innovations Rooted in a Technology Readiness Model Framework

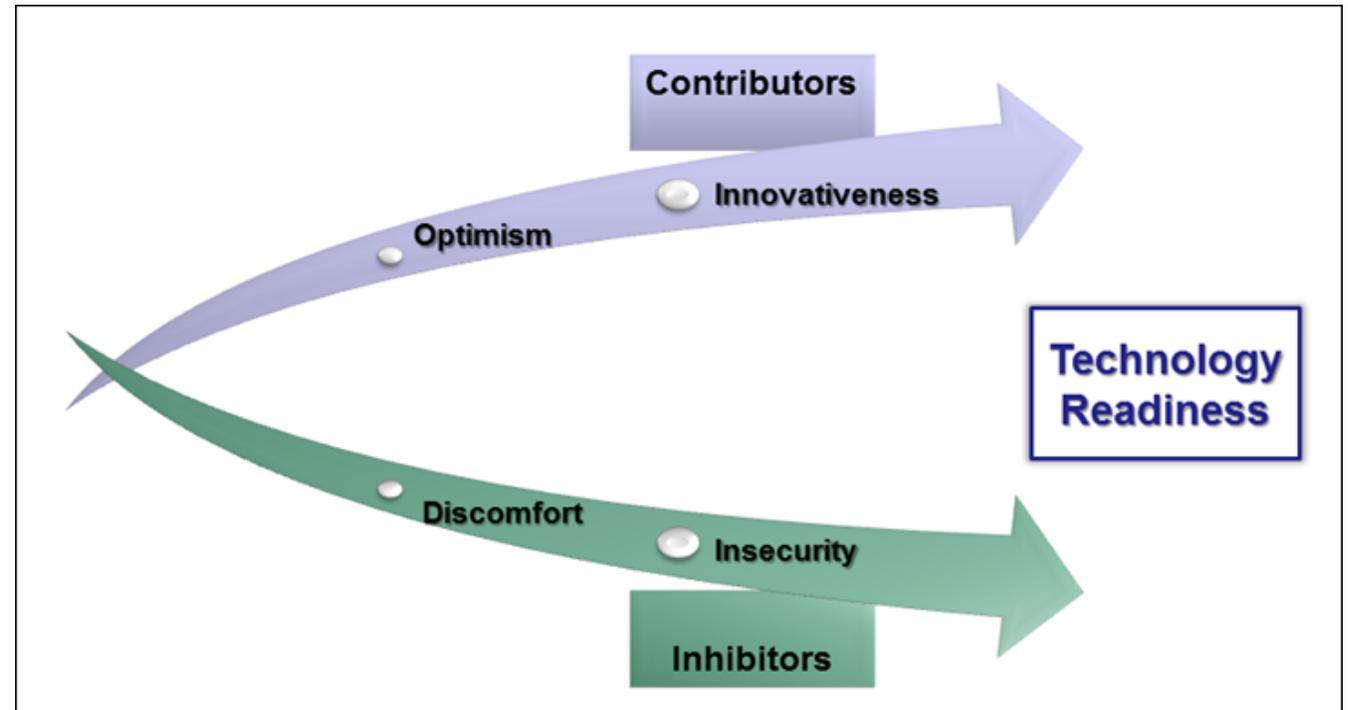
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# Study Objectives

- The Technology Readiness Index is widely used metric for evaluating individual propensity to adopt technology
- Since its introduction in 2000 (Parasuraman) and the introduction of a streamlined instrument in 2015 (Parasuraman & Colby), it has been widely used around globe, including “applied” studies (e.g., testing a healthcare app)
- The purpose of this study is to develop and test a technology evaluation metric based on the Technology Readiness Index (TRI) framework
- This is the culmination of several years of testing and refinement

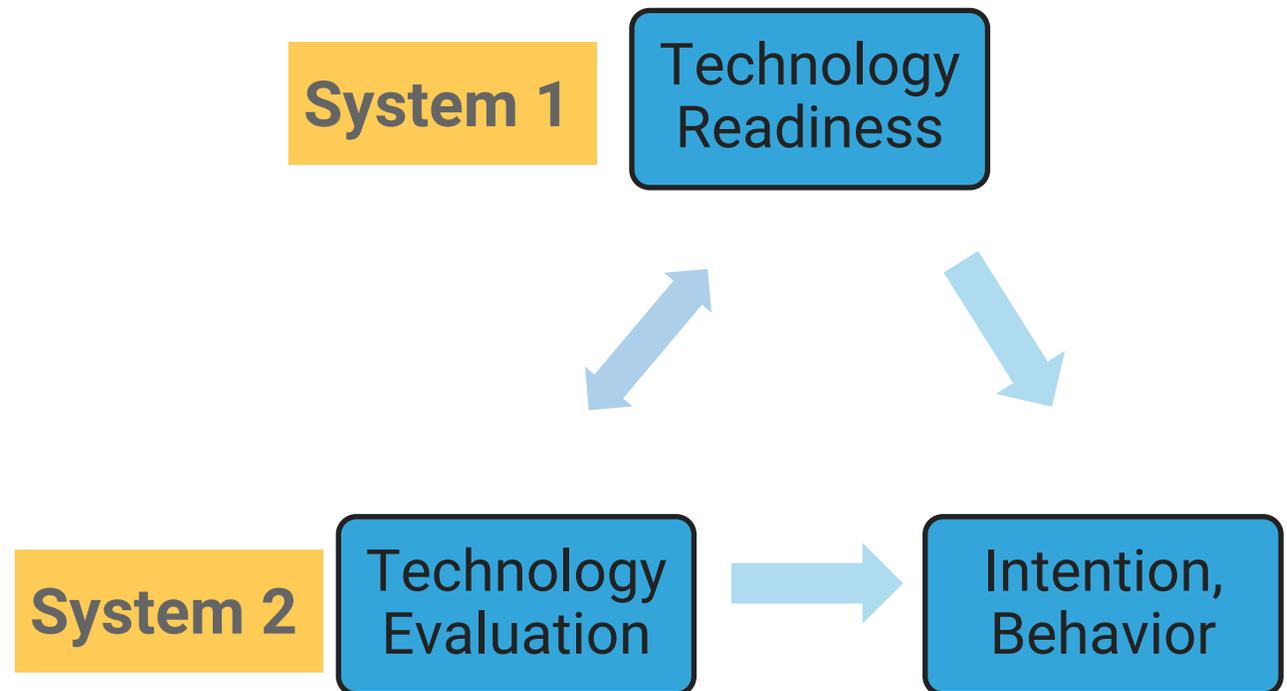
# Technology Readiness Index (TRI)

- Technology Readiness refers to an individual's propensity to adopt and embrace cutting-edge technology in a personal or workplace context
- Consists of two Contributor dimensions and two Inhibitor dimensions that tend to be independent (it is possible to both love and hate technology)
- TR is a strong predictor of adoption of cutting-edge services in a range of industries (e.g., digital banking, healthcare apps, robotics)
- The TRI 2.0 consists of 16 items, including 4 in each dimension



# Technology Readiness can be viewed as “System 1” construct (Kahneman)

- Technology Readiness can be viewed as capturing a person’s intuitive, automatic propensity to adopt technology
- The Technology Readiness Index (including the TRI 2.0) is a “psychographic” that describes the individual, not a specific technology, product or service



# System 2 Metrics

- Any study to fully explain technology adoption should include a System 1 and System 2 metric.
- Metrics that evaluate technology (and not just the consumer) include TAM (Davis), TAM2 (Venkatesh, Davis), UTAUT and UTAUT2 (Venkatesh et al).
  - The Technology Readiness Acceptance Model, or TRAM (Lin), includes elements of TAM and TRI.
- There is an opportunity to create a holistic model that uses a TRI framework to evaluate technology. This would use a consistent theoretical framework while allowing parsing out the degree to which acceptance is determined by the user or the specific technology.

# Methodology

- Survey of 1,022 U.S. consumers sampled from an online panel, as part of the 2021 National Technology Readiness Survey\*
- Stimulus: one paragraph description of a cutting-edge service technology; varied across 5 industries (travel, grocery, education, financial services, health)
- Technology Evaluation Instrument: 16 attributes designed to capture the same four dimensions as in the TRI 2.0
- Validation metrics: appeal, likelihood to adopt in 5 years (7-point scales)

\* Sponsored by Rockbridge Associates, A. Parasuraman and the Center for Excellence in Service at the Robert H. Smith School of Business, University of Maryland.

## Technologies Evaluated (Each Presented to 1/5<sup>th</sup> Sample)

[TRAVEL] **Personalized hotel service app and smart room** – provide permission to a hotel company and they will activate a travel app that provides more preferential and customized service through personal data from your previous visits. This service might include recognizing what temperature you like your room, what foods you order to your room or need stocked in a minibar, the lighting settings in your room, whether you request late check-out, etc. (1)

[GROCERY RETAIL] **Remote-controlled grocery cart** – order your groceries online and they are delivered to your home by this automated grocery cart. You will receive a text when the cart arrives at your home, and the cart will unlock for you to pick up your groceries. (2)

[EDUCATION] **Virtual reality education technology** – virtual reality is used to provide a realistic, immersive educational experience that makes learning fun and imprints knowledge. With the help of a virtual reality headset, you could be transported to another country to learn a foreign language, go back into history to witness events, or have the ability to stretch and change shapes to learn geometry concepts. This could be used by students or adults interested in continuing education. (3)

[FINANCIAL SERVICES] **Digital Banking Relationship** – use a financial institution that has no physical locations and allows you to conduct business completely using an app on your phone and/or at their website. Deposit checks remotely through your phone, pay bills and send/receive money, and manage your finances using digital financial tools. Sophisticated digital assistants are available 24/7 to answer questions and solve problems. (4)

[MENTAL HEALTH] **Digital mental health monitor** – whether you experience anxiety or merely want to lead a more carefree existence, this app monitors signs of your mental state (e.g., blood pressure, heart rate) through wearable technology connected to your smart phone and uses the information to apprise you of your mental health and offer digital tools to improve it. For example, it might recommend meditation or relaxing physical activities, provide calming sounds to help you sleep, and interactive quizzes that result in advice on lifestyle changes. (5)

# Tech Evaluation Attributes (4 Dimensions, 16 Items)

## CONTRIBUTORS

### Optimism/ Beneficial

- It would give me more control over my daily life
- It would make me more productive in my personal life
- It would contribute to a better quality of life for me
- It would give me greater freedom of mobility

### Innovative

- I would be the first in my circle of friends to acquire one
- I would like to keep up with the latest developments about this technology
- I would be willing to tell others about this technology
- I would enjoy the challenge of figuring out how to make it work

## INHIBITORS

### Discomfort

- I would have trouble getting it to work properly for me
- Only people skilled with technology could use it properly
- I could not get this to work correctly without needing help from others
- It is too complicated for me

### Insecurity

- I would become too dependent on this technology
- It would be unsafe
- It would distract me from other things to a degree that is negative
- It would lower the quality of my relationships with other people

# Exploratory Factor Analysis (Varimax Rotation)

<b>Contributor Dimensions: Beneficial and Innovative</b>	<b>1</b>	<b>2</b>
It would give me more control over my daily life [BEN]	<b>.82</b>	.49
It would give me greater freedom of mobility [BEN]	<b>.81</b>	.50
It would contribute to a better quality of life for me [BEN]	<b>.80</b>	.53
It would contribute to a better quality of life for me [BEN]	<b>.75</b>	.59
I would be the first in my circle of friends to acquire one [INN]	.45	<b>.81</b>
I would enjoy the challenge of figuring out how to make it work [INN]	.51	<b>.78</b>
I would be willing to tell others about this technology [INN]	.56	<b>.73</b>
I would like to keep up with the latest developments about this technology [INN]	.63	<b>.70</b>

Explains 89% of variance

<b>Inhibitor Dimensions: Discomfort and Insecurity</b>	<b>1</b>	<b>2</b>
I could not get this to work correctly without needing help from others [DIS]	<b>.84</b>	.34
I would have trouble getting it to work properly for me [DIS]	<b>.83</b>	.38
It is too complicated for me [DIS]	<b>.82</b>	.38
Only people skilled with technology could use it properly [DIS]	<b>.76</b>	.36
It would lower the quality of my relationships with other people [INS]	.27	<b>.83</b>
I would become too dependent on this technology [INS]	.33	<b>.74</b>
It would distract me from other things to a degree that is negative [INS]	.45	<b>.72</b>
It would be unsafe [INS]	.39	<b>.66</b>

Explains 74% of variance

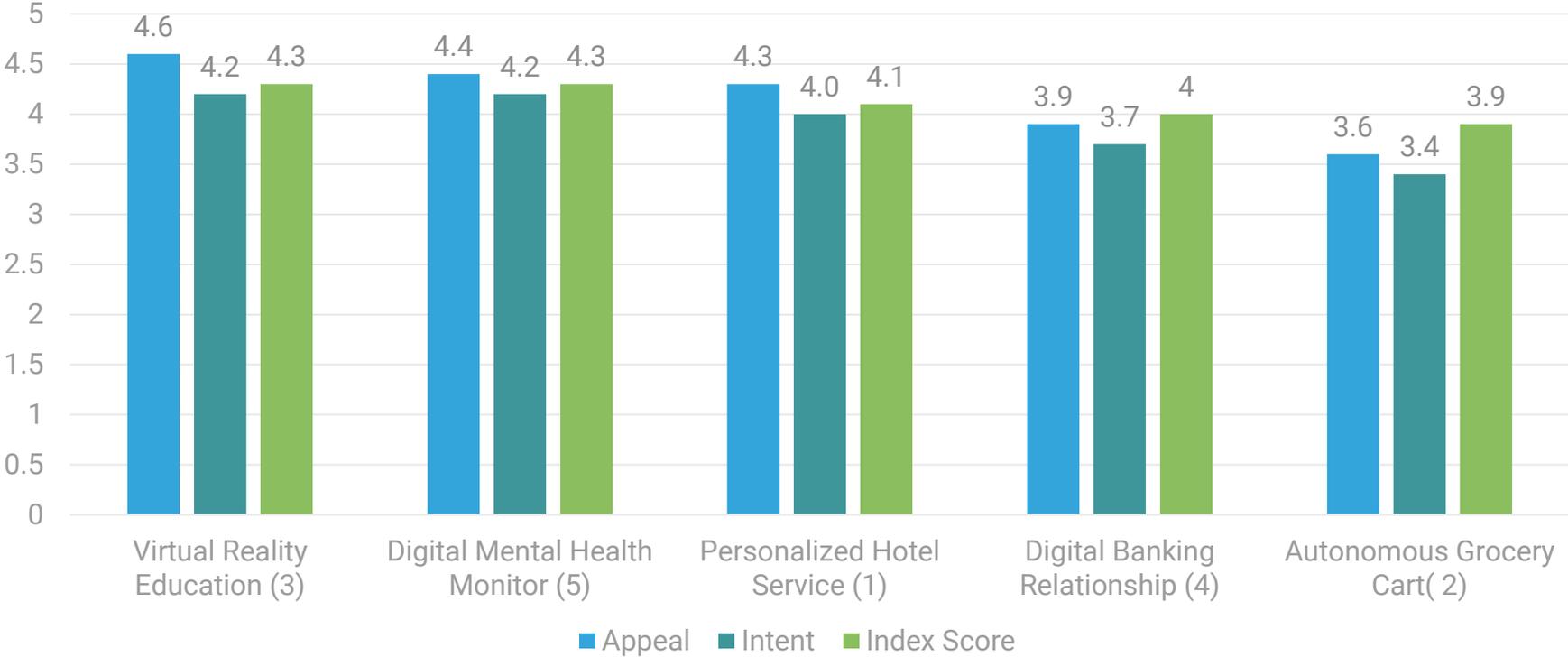
# CFA: Model fit is high

- Goodness-of-fit-index (GFI) = .94 (should be  $\geq .9$ )
- Normed-fit-index (NFI) = .97 (should be  $\geq .95$ )
- Comparative Fit Index (CFI) = .98 (should be  $\geq .95$ )
- Root Mean Square Residual (RMSEA) = .065 (should be  $\leq .06$ )
- Discriminant validity exists across Motivator and Inhibitor dimensions, but not within

	<b>Beneficial</b>	<b>Innovative</b>	<b>Discomfort</b>	<b>Insecure</b>
Cronbach Alpha	.97	.94	.92	.84
Composite Reliability	.97	.95	.92	.85
AVE	.89	.81	.73	.58

# The Evaluation Index correlates with appeal and likelihood to adopt (Intent)

Evaluation of Five Cutting-Edge Technologies

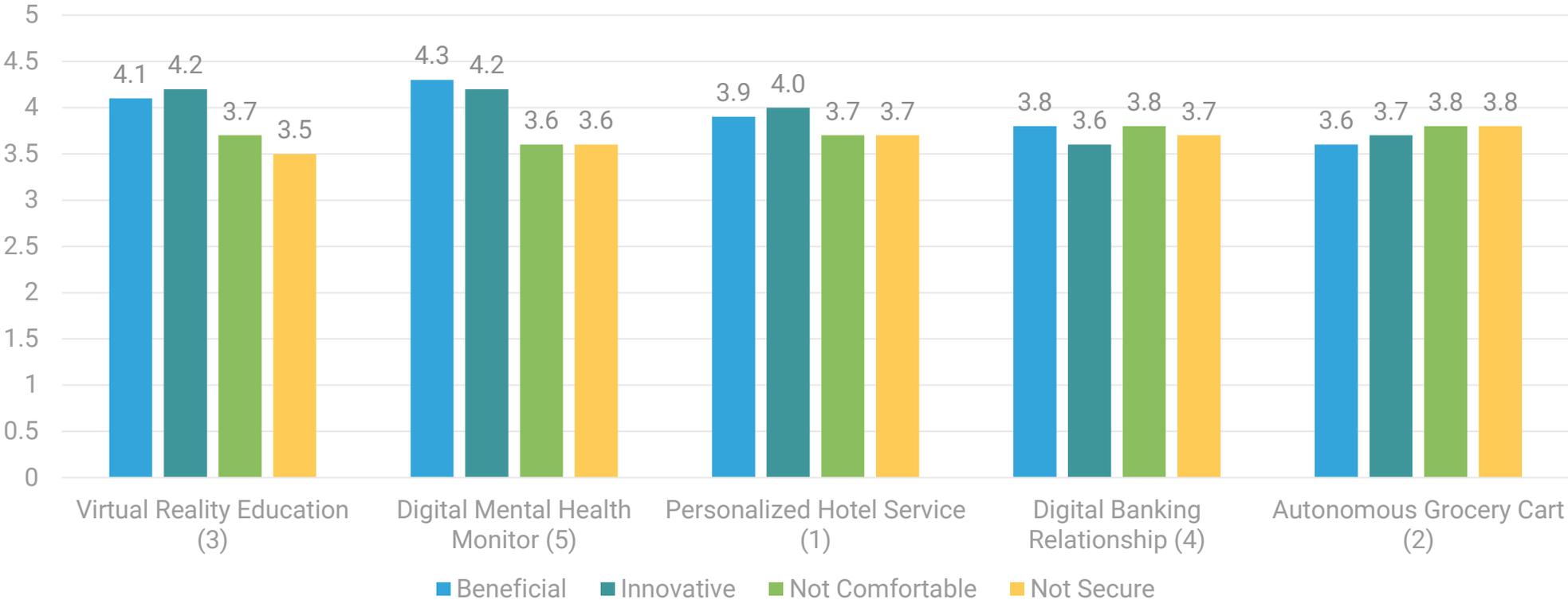


- Correlations:
- Index with appeal: .695 (.000)
  - Index with Intent: .679 (.000)

\*Note: differences between groups all significant; appeal (.000), intent (.001), index score (.01)

# Contributor dimensions vary significantly across products, while inhibitors are the same

Evaluation of Five Cutting-Edge Technologies



\*Note: differences between groups are significant for Beneficial (.020) and Innovative (.021); no significant differences for Not Comfortable and Not Secure

# Each product has unique System 2 and System 1 correlates, helping explain acceptance

	All Products	Virtual Reality Education (3)	Digital Mental Health Monitor (5)	Personalized Hotel Service (1)	Digital Banking Relationship (4)	Autonomous Grocery Cart (2)
<b>Evaluation Dimensions</b>						
<b>System 2: The Service</b>	Beneficial	<b>0.85**</b>	<b>0.78**</b>	<b>0.90**</b>	<b>0.84**</b>	<b>0.86**</b>
	Innovative	<b>0.85**</b>	<b>0.81**</b>	<b>0.85**</b>	<b>0.86**</b>	<b>0.83**</b>
	Not Comfortable	-0.04	<b>-0.16*</b>	0.08	0.01	<b>-0.30**</b>
	Not Secure	-0.01	-0.06	0.11	0.03	<b>-0.21**</b>
<b>TRI Dimensions</b>						
<b>System 1: The User</b>	Optimism	<b>0.59**</b>	<b>0.58**</b>	<b>0.60**</b>	<b>0.57**</b>	<b>0.68**</b>
	Innovativeness	<b>0.65**</b>	<b>0.66**</b>	<b>0.48**</b>	<b>0.62**</b>	<b>0.79**</b>
	Discomfort	-0.02	<b>-0.25*</b>	0.08	0.03	-0.16
	Insecurity	<b>-0.17*</b>	<b>-0.32**</b>	0.07	-0.07	<b>-0.40**</b>

# Conclusions

- A technology evaluation metric based on a TR framework helps explain acceptance of a cutting-edge service, with potential implications for marketing and management of roll-outs.
- ✓ Is acceptance driven by service perceptions, user beliefs, or both?
- ✓ Which facets of technology readiness motivating/inhibit adoption?
- Model fit is generally good.
- Motivator dimensions have the strongest correlation with acceptance, but inhibitors also correlate.