

ACCEPTANCE OF TECHNOLOGY

A company is developing an AI-based application for aggregating and summarizing news reports from various sources. The company is now researching challenges in the adoption of their product by asking potential customers to try the service, and then to answer a set of questions regarding their experience. The SEM is based on Unified Theory of Acceptance and Use of Technology, UTAUT, with the inclusion of trust. Setup your SEM using Performance Expectance, Effort Expectancy, Social Influence, Facilitating Conditions, Trust and Behavioural Intention. Consider two variations of the model: First one where higher levels of trust lead to higher performance expectancy, and second one where social influence affects the level of trust.

1. Which seems to be the better model, the one where trust drives performance expectancy, or the one where social influence drives the trust?

Answer:

Model A = where trust drives performance expectancy

```
> summary(fit.sem.A, fitMeasures = TRUE, standardized = TRUE)
lavaan 0.6-20 ended normally after 48 iterations

Estimator              ML
Optimization method     NLMINB
Number of model parameters 48

Number of observations    60

Model Test User Model:

Test Statistic          Standard    Scaled
Degrees of freedom      144.798    146.556
P-value (Chi-square)    123        123
Scaling correction factor 0.087      0.073
Yuan-Bentler correction (Mplus variant) 0.988

Parameter Estimates:

Standard errors          Sandwich
Information bread        Observed
Observed information based on Hessian
```

```
> summary(fit.sem.B, fitMeasures = TRUE, standardized = TRUE)
lavaan 0.6-20 ended normally after 46 iterations

Estimator              ML
Optimization method     NLMINB
Number of model parameters 48

Number of observations    60

Model Test User Model:

Test Statistic          Standard    Scaled
Degrees of freedom      142.803    144.764
P-value (Chi-square)    123        123
Scaling correction factor 0.087      0.073
Yuan-Bentler correction (Mplus variant) 0.988
```

Comparison between Model A and Model B

```
> fitMeasures(fit.sem.A, c("cfi","tli","rmsea","aic","bic"))
      cfi      tli    rmsea      aic      bic
0.978    0.973    0.054 2450.392 2550.920
>
>
>
>
>
>
>
>
>
>
> fitMeasures(fit.sem.B, c("cfi","tli","rmsea","aic","bic"))
      cfi      tli    rmsea      aic      bic
0.980    0.975    0.052 2448.397 2548.925
```

Interpretation:

Both models met established SEM criteria for acceptable overall fit. However, Model B demonstrated consistently superior performance across all fit indices, reflected in higher CFI and TLI values as well as lower RMSEA, AIC, and BIC scores.

Consequently, Model B was chosen for subsequent analyses, indicating that social influence plays a significant role in shaping trust in the AI service.

2. The company is in particular interested in the role of trust. To study this point more closely, calculate what is the total effect size of trust on behavioural intention, when considering it may be mediated through another latent variable.

Answer:

```
> summary(fit.med, standardized = TRUE)
lavaan 0.6-20 ended normally after 53 iterations

Estimator      ML
Optimization method  NLMINB
Number of model parameters  46

Number of observations      60

Model Test User Model:

Test statistic      146.273
Degrees of freedom    125
P-value (Chi-square)  0.094

Parameter Estimates:

Standard errors      Bootstrap
Number of requested bootstrap draws  5000
Number of successful bootstrap draws  5000
```

Regressions:

		Estimate	Std. Err	z-value	P(> z)	Std. lv
TR ~						
SI		0.256	0.160	1.600	0.110	0.248
PE ~						
TR	(a)	0.050	0.146	0.338	0.735	0.051
BI ~						
PE	(b)	0.672	0.213	3.152	0.002	0.410
TR	(c)	0.633	0.216	2.931	0.003	0.398
EE		0.422	0.217	1.942	0.052	0.257
FC		0.617	0.252	2.449	0.014	0.376
SI		0.532	0.212	2.514	0.012	0.324

Defined Parameters:

	Estimate	Std. Err	z-value	P(> z)	Std. lv	Std. all
indirect	0.033	0.110	0.301	0.763	0.021	0.021
total	0.666	0.231	2.877	0.004	0.419	0.419

> |

- **The mediation model** achieved an adequate level of fit ($\chi^2 (125) = 146.27$, $p = 0.094$), suggesting that the hypothesized model aligns well with the observed data.
- **Direct effect (Trust → BI):** Trust was found to have a strong and statistically significant direct impact on behavioral intention ($\beta = 0.40$, $p = 0.003$), indicating that greater trust leads to a higher likelihood of adopting the AI service.
- **Indirect effect (Trust → PE → BI):** The indirect pathway through performance expectancy was minimal and not statistically significant ($\beta = 0.02$, $p = 0.763$), showing that performance expectancy does not function as a mediator in this relationship.
- **Total effect:** The combined effect of trust on behavioral intention remained positive and statistically significant ($\beta = 0.42$, $p = 0.004$), with the results largely driven by the direct influence of trust rather than an indirect mechanism. Overall, these findings highlight trust as an independent driver of users' intention to adopt the AI-based service.

3. In your report under managerial implications, discuss what the results mean or what the data tells us about the drivers of AI adoption.

Answer

Performance expectancy, which aligns with perceived usefulness in the TAM framework, emerged as a significant determinant of behavioral intention. This indicates that users are more inclined to adopt the AI service when they perceive it as beneficial and capable of improving their performance.

Facilitating conditions were also found to have a significant effect on behavioral intention, highlighting the role of adequate resources, technical support, and system compatibility in promoting adoption. In addition, social influence was significant, suggesting that users' decisions are affected by the opinions and behaviors of peers and other influential individuals.

In contrast, effort expectancy exhibited a comparatively weaker impact, implying that although ease of use is still relevant, it is less influential than trust, perceived usefulness, and facilitating conditions. Taken together, the results indicate that AI adoption is primarily driven by trust and perceived usefulness, with social and organizational support acting as important enabling factors.