

**MODEL STRUKTURAL PERAN MEDIASI IDENTITAS KETEKNIKAN
DALAM MEMPREDIKSI KOMITMEN KARIER
MAHASISWA TEKNIK INDONESIA**



DISERTASI

diajukan untuk memenuhi sebagian dari syarat memperoleh gelar Doktor Pendidikan
Program Studi Pendidikan Teknologi dan Kejuruan

Oleh:

Wasimudin Surya Saputra

1808727

**PROGRAM STUDI PENDIDIKAN TEKNOLOGI DAN KEJURUAN
SEKOLAH PASCASARJANA
UNIVERSITAS PENDIDIKAN INDONESIA
2025**

**Model Struktural Peran Mediasi Identitas Keteknikan
Dalam Memprediksi Komitmen Karier
Mahasiswa Teknik Indonesia**

Oleh
Wasimudin Surya Saputra

S.T. Institut Teknologi Bandung, 1995
M.T. Institut Teknologi Bandung, 2002

Sebuah Disertasi yang diajukan untuk memenuhi salah satu syarat memperoleh gelar
Doktor Pendidikan (Dr.) pada Program Studi Pendidikan Teknologi dan Kejuruan

© Wasimudin Surya Saputra 2025
Universitas Pendidikan Indonesia
Agustus 2025

Hak Cipta dilindungi undang-undang.
Disertasi ini tidak boleh diperbanyak seluruhnya atau sebagian,
dengan dicetak ulang, difoto kopi, atau cara lainnya tanpa ijin dari penulis.

WASIMUDIN SURYA SAPUTRA

**MODEL STRUKTURAL PERAN MEDIASI IDENTITAS KETEKNIKAN
DALAM MEMPREDIKSI KOMITMEN KARIER
MAHASISWA TEKNIK INDONESIA**

disetujui dan disahkan oleh panitia disertasi:

Promotor



Prof. Dr. H. R. Aam Hamdani, M.T.

NIP. 19660111 199101 1 001

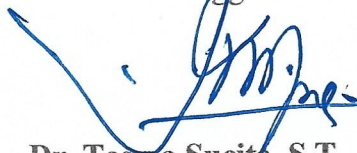
Kopromotor



Dr. Ir. H. Agus Solehudin, S.T., M.T., IPM

NIP. 19680218 199903 1 001

Anggota



Dr. Tasma Sucita, S.T., M.T.

NIP. 19641007 199101 1 001

Mengetahui,

Ketua Program Studi Pendidikan Teknologi dan Kejuruan



Prof. Dr. Isma Widiaty, S.Pd., M.Pd.

NIP. 19710607 200112 2 001

ABSTRAK

Minat terhadap pendidikan teknik memiliki peran strategis dalam membangun sumber daya manusia yang berdaya saing tinggi di era industri 4.0 dan transformasi digital. Namun demikian, rendahnya komitmen karier di kalangan mahasiswa teknik di Indonesia masih menjadi tantangan serius, terutama ketika dihadapkan pada fenomena karier postmodern seperti *job hopping*, *boundaryless career*, dan *zigzag career*, yang kerap melemahkan dedikasi lulusan terhadap bidang teknik. Penelitian ini bertujuan untuk menganalisis peran mediasi identitas keteknikan dalam hubungan antara efikasi diri akademik, motivasi intrinsik, dan minat STEM terhadap komitmen karier teknik pada mahasiswa teknik di Indonesia.

Data dikumpulkan melalui survei terhadap 870 mahasiswa dari berbagai program studi teknik di perguruan tinggi di Indonesia, menggunakan instrumen kuesioner skala Likert dan dianalisis dengan pendekatan Partial Least Squares Structural Equation Modeling (PLS-SEM) yang berorientasi pada pengembangan teori. Hasil penelitian menunjukkan bahwa efikasi diri akademik, motivasi intrinsik, dan minat STEM memiliki pengaruh positif dan signifikan terhadap identitas keteknikan, yang selanjutnya secara signifikan berkontribusi pada komitmen karier teknik. Identitas keteknikan juga terbukti memediasi secara parsial hubungan antara ketiga variabel prediktor dan komitmen karier teknik.

Temuan ini menegaskan bahwa identitas keteknikan berfungsi sebagai mekanisme psikologis penting dalam menjembatani faktor internal dan orientasi karier mahasiswa teknik, sekaligus memperluas aplikasi Social Cognitive Career Theory dalam konteks pendidikan tinggi teknik di Indonesia. Implikasi praktis dari penelitian ini menggarisbawahi pentingnya penguatan program pengembangan identitas keteknikan melalui strategi kurikulum yang lebih kontekstual, berbasis motivasi intrinsik, dan berfokus pada *value beyond competence*, yakni pembentukan identitas, motivasi, dan dedikasi profesional selain penguasaan keterampilan teknis.

Kata Kunci: identitas keteknikan, efikasi diri akademik, motivasi intrinsik, minat STEM, komitmen karier teknik, Social Cognitive Career Theory, karier postmodern, PLS-SEM.

ABSTRACT

Interest in engineering education plays a strategic role in building highly competitive human resources in the era of Industry 4.0 and digital transformation. Nevertheless, the low level of career commitment among engineering students in Indonesia remains a serious challenge, particularly in light of postmodern career phenomena such as *job hopping*, *boundaryless career*, and *zigzag career*, which often weaken graduates' dedication to the engineering profession. This study aims to analyze the mediating role of engineering identity in the relationship between academic self-efficacy, intrinsic motivation, and STEM interest with career commitment to engineering among Indonesian engineering students.

Data were collected through a survey of 870 students from various engineering programs at Indonesian universities, using a Likert-scale questionnaire and analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM), a theory-building oriented approach. The findings indicate that academic self-efficacy, intrinsic motivation, and STEM interest exert positive and significant effects on engineering identity, which in turn significantly contributes to career commitment to engineering. Moreover, engineering identity is found to partially mediate the relationships between the three predictor variables and career commitment.

These findings underscore that engineering identity serves as a crucial psychological mechanism that bridges internal factors with students' career orientation, while simultaneously extending the application of Social Cognitive Career Theory in the context of engineering higher education in Indonesia. The practical implications highlight the need to strengthen engineering identity development programs through more contextualized curricula, intrinsically motivating strategies, and a focus on value beyond competence—the cultivation of identity, motivation, and professional dedication in addition to technical skills.

Keywords: engineering identity, academic self-efficacy, intrinsic motivation, STEM interest, career commitment to engineering, Social Cognitive Career Theory, postmodern career, PLS-SEM.

DAFTAR ISI

HALAMAN JUDUL	
LEMBAR PENGESAHAN	i
PERNYATAAN BEBAS PLAGIARISME	ii
KATA PENGANTAR	iii
ABSTRAK	v
DAFTAR ISI	vii
DAFTAR TABEL	x
DAFTAR GAMBAR	xi
DAFTAR LAMPIRAN	xii
BAB I PENDAHULUAN	1
1.1 Latar Belakang Penelitian	1
1.2 Rumusan Masalah	4
1.3 Tujuan Penelitian	5
1.4 Manfaat Penelitian	6
1.5 Ruang Lingkup Penelitian	7
1.6 Signifikansi dan Kontribusi Penelitian	10
1.7 Sistematika Penulisan	12
BAB II KAJIAN PUSTAKA	14
2.1 Kajian Teori	14
2.1.1 Teori Identitas dalam Konteks Teknik (<i>Engineering Identity</i>)	15
2.1.2 <i>Academic Self-Efficacy</i>	16
2.1.3 <i>Intrinsic Motivation</i> dalam Teori <i>Self-Determination</i>	20
2.1.4 Minat terhadap STEM (<i>STEM Interest</i>)	22
2.1.5 Komitmen Karier Teknik (<i>Career Commitment to Engineering</i>)	25
2.1.6 Teori Mediasi dan Model SEM	27
2.1.7 Hubungan antarvariabel dalam Literatur Terkait	30
2.1.7.1 Hubungan antara Efikasi Diri Akademik, Motivasi Intrinsik, Minat STEM dengan Identitas Keteknikan	30
2.1.7.2 Hubungan antara Efikasi Diri Akademik, Motivasi Intrinsik, Minat STEM dengan Komitmen Karier Teknik	31

2.1.7.3 Hubungan antara Identitas Keteknikan dengan Komitmen Karier Teknik	32
2.1.7.4 Peran Mediasi Identitas Keteknikan	32
2.2 Penelitian Terdahulu (<i>State of the Art</i>)	33
2.2.1 Hubungan Efikasi Diri Akademik dengan Identitas Keteknikan	33
2.2.2 Hubungan Motivasi Intrinsik dengan Identitas Keteknikan	35
2.2.3 Hubungan Minat STEM dengan Identitas Keteknikan	36
2.2.4 Hubungan Identitas Keteknikan dengan Komitmen Karier Teknik ...	38
2.2.5 Hubungan Efikasi Diri Akademik, Motivasi Intrinsik, Minat STEM dengan Komitmen Karier Teknik (Pengaruh Langsung DAN Mediasi Identitas Keteknikan)	39
2.2.6 Penelitian tentang Peran Mediasi Identitas Profesional	41
2.2.7 <i>State of the Art</i> dan Kesenjangan Penelitian	42
2.3 Kerangka Pemikiran dan Pengembangan Model	43
2.4 Studi Empiris Terkini dan Variasi Temuan Mediasi Identitas Keteknikan	45
2.5 Kerangka Konseptual Penelitian (<i>Conceptual Framework</i>)	48
2.6 Hipotesis Penelitian	51
BAB III METODE PENELITIAN	53
3.1 Pendekatan dan Desain Penelitian	53
3.2 Lokasi dan Waktu Penelitian	54
3.3 Populasi dan Sampel	54
3.4 Instrumen Penelitian	55
3.4.1 Validitas dan Reliabilitas Instrumen	57
3.4.2 Tabel Spesifikasi Item	59
3.5 Teknik Pengumpulan Data	60
3.6 Teknik Analisis Data	62
3.6.1 Analisis Deskriptif	62
3.6.2 Uji Eksploratori Faktor (<i>Exploratory Factor Analysis</i> - EFA)	62
3.6.3 Evaluasi Model Pengukuran (CFA)	64
3.6.4 Evaluasi Model Struktural (SEM SmartPLS)	66
3.6.5 Uji Mediasi dan Signifikansi Jalur	68

BAB IV TEMUAN DAN PEMBAHASAN	69
4.1 Deskripsi Data Responden	69
4.2 Statistik Deskriptif Variabel Penelitian	70
4.3 Hasil Uji Eksploratori Faktor (<i>Exploratory Factor Analysis</i> - EFA)	72
4.4 Evaluasi Model Pengukuran	74
4.5 Hasil Analisis Model Struktural	86
4.6 Uji Mediasi dan Interpretasi	88
4.7 Evaluasi Relevansi Prediktif Model (PLSpredict)	90
4.8 Uji Kecocokan Model (Model Fit)	91
4.9 Temuan Utama Penelitian	93
4.10 Interpretasi dan Pembahasan Hasil Penelitian	95
4.11 Hubungan dengan Literatur dan Teori Sebelumnya	98
4.12 Keterbatasan Hasil	99
4.13 Diskusi Khusus: Karier Postmodern dan Implikasi Penelitian	101
BAB V SIMPULAN, IMPLIKASI, DAN REKOMENDASI	105
5.1 Simpulan	105
5.2 Implikasi Teoretis	106
5.3 Implikasi Praktis	107
5.4 Implikasi Kebijakan	108
5.5 Keterbatasan Penelitian	109
5.6 Saran untuk Penelitian Selanjutnya	110
5.7 Rekomendasi untuk Praktik Pendidikan Teknik	111
DAFTAR PUSTAKA	112
LAMPIRAN	122

DAFTAR TABEL

Tabel 2.1: Perbandingan Singkat Studi Empiris Terkini	47
Tabel 2.2: Konstruk, Dimensi, dan Contoh Indikator	50
Tabel 3.1: Pengujian Validitas dan Reliabilitas Instrumen	58
Tabel 3.2: Spesifikasi Item Kuesioner Penelitian	59
Tabel 4.1 Deskripsi Data Responden	69
Tabel 4.2 Statistik Deskriptif Variabel Penelitian	70
Tabel 4.3 <i>Construct Reliability & Validity</i>	76
Tabel 4.4 <i>Discriminant Validity</i>	76
Tabel 4.5 <i>Construct Reliability & Validity</i> setelah EI dijadikan orde 1	78
Tabel 4.6 <i>Discriminant Validity</i> setelah EI dijadikan orde 1	78
Tabel 4.7 <i>Construct Reliability & Validity</i> setelah EI dijadikan orde 1 dan ASE4 dihapus	79
Tabel 4.8 <i>Discriminant Validity</i> setelah EI dijadikan orde 1 dan ASE4 dihapus	80
Tabel 4.9 <i>Construct Reliability & Validity</i> pada <i>Stage 2</i>	82
Tabel 4.10 <i>Discriminant Validity</i> pada <i>Stage 2</i>	82
Tabel 4.11 <i>Construct Reliability & Validity</i> pada <i>Stage 2</i> setelah EI1, EI4, dan EI11 dihapus	83
Tabel 4.12 <i>Discriminant Validity</i> pada <i>Stage 2</i> Setelah EI1, EI4, dan EI11 dihapus ..	84
Tabel 4.13 Indikator VIF (Outer VIF)	85
Tabel 4.14 Koefisien Jalur (Efek Langsung)	86
Tabel 4.15 Koefisien Jalur (Efek Tidak Langsung)	88
Tabel 4.16 VIF Konstruk Laten (Inner VIF)	89
Tabel 4.17 Ringkasan Prediksi Variabel Laten	90
Tabel 4.18 (a) Model Fit, (b) rms Theta, (c) R square, dan (d) f square	91
Tabel 4.19 Ringkasan Hasil Uji Hipotesis Penelitian	94

DAFTAR GAMBAR

Gambar 2.1: Ilustrasi M memediasi hubungan tidak langsung X dengan Y	28
Gambar 2.2: Kerangka Konseptual Penelitian	50
Gambar 4.1: Hasil <i>Exploratory Factor Analysis (EFA)</i>	73
Gambar 4.2 Tampilan visual hasil running PLS Algorithm pada Smart PLS 3.0	75
Gambar 4.3 Tampilan visual hasil running PLS Algorithm pada Smart PLS 3.0 setelah <i>engineering identity</i> diturunkan menjadi orde 1	78
Gambar 4.4 Tampilan visual hasil running PLS Algorithm pada Smart PLS 3.0 setelah <i>engineering identity</i> diturunkan menjadi orde 1 dan ASE4 dihapus	79
Gambar 4.5 Tampilan visual hasil running PLS Algorithm pada Smart PLS 3.0 untuk <i>Stage 2</i>	81
Gambar 4.6 Tampilan visual hasil running PLS Algorithm pada Smart PLS 3.0 untuk <i>Stage 2</i> setelah EI1, EI4, dan EI11 dihilangkan	83

DAFTAR LAMPIRAN

Lampiran 1: Surat Penunjukan Pembimbing Disertasi	112
Lampiran 2: Lembar Penilaian Ahli (<i>Expert Judgement</i>)	114
Lampiran 3: Pernyataan Penggunaan AI dalam Penyusunan Instrumen Penelitian ...	129
Lampiran 4: Kuesioner Penelitian	130
Lampiran 5: Indikator <i>Engineering Identity</i> yang Dikembangkan oleh Godwin (2016)	135
Lampiran 6: Sampel Data Hasil Kuesioner	136
Lampiran 7: Statistik Deskriptif Data Hasil Kuesioner	140
Lampiran 8: Hasil <i>Exploratory Factor Analysis (EFA)</i>	141
Lampiran 9: Hasil Evaluasi Model Pengukuran dan Struktural dengan SEM SmartPLS	143

DAFTAR PUSTAKA

- Amalina, I. K., Vidákovich, T., & Karimova, K. (2025). Factors influencing student interest in STEM careers: Motivational, cognitive, and socioeconomic status. *Humanities and Social Sciences Communications*, 12, 102. <https://doi.org/10.1057/s41599-025-04446-2>
- Archer, L., Moote, J., MacLeod, E., Francis, B., & DeWitt, J. (2021). Patterns of STEM participation: An intersectional analysis of student pathways into STEM post-16. *Science Education*, 105(3), 578–600. <https://doi.org/10.1002/sce.21615>
- Arthur, M. B., & Rousseau, D. M. (1996). *The boundaryless career: A new employment principle for a new organizational era*. Oxford University Press.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182. <https://doi.org/10.1037/0022-3514.51.6.1173>
- Bappenas. (2019). *Rencana pembangunan jangka menengah nasional 2020–2024*. Kementerian Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional.
- Betz, N. E., & Hackett, G. (1981). The relationship of career-related self-efficacy expectations to perceived career options in college women and men. *Journal of Counseling Psychology*, 28(5), 399–410. <https://doi.org/10.1037/0022-0167.28.5.399>
- Blau, G. J. (1985). The measurement and prediction of career commitment. *Journal of Occupational Psychology*, 58(4), 277–288. <https://doi.org/10.1111/j.2044-8325.1985.tb00201.x>
- Briscoe, J. P., Hall, D. T., & DeMuth, R. L. F. (2012). Protean and boundaryless careers: An empirical exploration. *Journal of Vocational Behavior*, 81(2), 151–161. <https://doi.org/10.1016/j.jvb.2012.04.006>
- BPS. (2021). *Statistik pendidikan tinggi 2021*. Badan Pusat Statistik.
- BPS. (2023). *Statistik ketenagakerjaan Indonesia*. Badan Pusat Statistik.
- Byars-Winston, A., & Rogers, J. G. (2019). Testing intersectionality of race/ethnicity $\times$ gender in a social-cognitive career theory model with science

- identity. *Journal of Counseling Psychology*, 66(1), 30–44. <https://doi.org/10.1037/cou0000309>
- Byars-Winston, A., O'Brien, K., & Rodela, D. (2021). The role of STEM interest and self-efficacy in STEM career choice: A meta-analysis. *Journal of Career Assessment*, 29(1), 12–28.
- Cardella, M. E., Atman, C. J., Turns, J., & Adams, R. S. (2022). Engineering identity development in early undergraduate years: Longitudinal evidence. *Journal of Engineering Education*, 111(2), 273–296. <https://doi.org/10.1002/jee.20431>
- Carlone, H. B., & Johnson, A. (2007). Understanding the science experiences of successful women of color: Science identity as an analytic lens. *Journal of Research in Science Teaching*, 44(8), 1187–1218. <https://doi.org/10.1002/tea.20237>
- Carson, K. D., & Bedeian, A. G. (1994). Career commitment: Construction of a measure and examination of its psychometric properties. *Journal of Vocational Behavior*, 44(3), 237–262. <https://doi.org/10.1006/jvbe.1994.1017>
- Chemers, M. M., Hu, L., & Garcia, B. F. (2001). Academic self-efficacy and first year college student performance and adjustment. *Journal of Educational Psychology*, 93(1), 55–64. <https://doi.org/10.1037/0022-0663.93.1.55>
- Chen, X., Zhang, L., & McGrath, C. (2021). Intrinsic motivation and identity among STEM students: A structural equation model. *Journal of Science Education and Technology*, 30(1), 48–60. <https://doi.org/10.1007/s10956-020-09882-5>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Colarelli, S. M., & Bishop, R. C. (1990). Career commitment: Functions, correlates, and management. *Group & Organization Studies*, 15(2), 158–176. <https://doi.org/10.1177/105960119001500203>
- Collin, A., & Watts, A. G. (1996). The death and transfiguration of career—and of career guidance? *British Journal of Guidance & Counselling*, 24(3), 385–398. <https://doi.org/10.1080/03069889608253023>
- Costello, A. B., & Osborne, J. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, 10(7), 1–9. <https://doi.org/10.7275/jvj1-4868>

- Côté, J. E. (2016). Identity capital model: A handbook of theory, methods, and findings. *Journal of Adolescence*, 47, 180–190. <https://doi.org/10.1016/j.adolescence.2015.11.006>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer.
- Deci, E. L., & Ryan, R. M. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01
- Eccles, J. S., & Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology*, 61, 101859. <https://doi.org/10.1016/j.cedpsych.2020.101859>
- Estrada, M., Hernandez, P. R., & Schultz, P. W. (2019). A longitudinal study of major retention in science by underrepresented minority students. *CBE—Life Sciences Education*, 17(3), ar45. <https://doi.org/10.1187/cbe.17-06-0116>
- Evans, J. R., & Mathur, A. (2018). The value of online surveys: A review of issues and approaches. *Internet Research*, 28(4), 854–887. <https://doi.org/10.1108/INTR-03-2017-0099>
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272–299. <https://doi.org/10.1037/1082-989X.4.3.272>
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.2307/3151312>
- Fouad, N. A., & Santana, M. C. (2017). Career development in a diverse context. In J. P. Sampson, E. Bullock-Yowell, V. C. Dozier, D. S. Osborn, & J. G. Lenz (Eds.), *APA handbook of career intervention: Vol. 1. Foundations* (pp. 165–178). American Psychological Association. <https://doi.org/10.1037/00000345-011>
- Fugate, M., Kinicki, A. J., & Ashforth, B. E. (2004). Employability: A psycho-social construct, its antecedents, and consequences. *Journal of Business and Psychology*, 19(1), 43–60.

- Fugate, M., Kinicki, A. J., & Ashforth, B. E. (2021). Employability: A psycho-social construct, its dimensions, and applications. *Journal of Vocational Behavior*, 129, 103621. <https://doi.org/10.1016/j.jvb.2021.103621>
- Godwin, A. (2016). The development of a measure of engineering identity. *ASEE Annual Conference & Exposition Proceedings*. <https://doi.org/10.18260/p.26122>
- Godwin, A., Potvin, G., Hazari, Z., & Lock, R. (2016). Identity, critical agency, and engineering: An affective model for women's persistence in engineering. *Journal of Engineering Education*, 105(4), 738–766. <https://doi.org/10.1002/jee.20118>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). SAGE.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer. <https://doi.org/10.1007/978-3-030-80519-7>
- Hall, D. T. (2004). The protean career: A quarter-century journey. *Journal of Vocational Behavior*, 65(1), 1–13. <https://doi.org/10.1016/j.jvb.2003.10.006>
- Hall, D. T., Briscoe, J. P., & Cochran, A. (2018). The new career: A review of the past decade and recommendations for the future. *Journal of Management*, 44(2), 481–507.
- Hall, D. T., Yip, J., & Doiron, K. (2018). Protean careers at work: Self-direction and values orientation in psychological success. *Annual Review of Organizational Psychology and Organizational Behavior*, 5, 129–156. <https://doi.org/10.1146/annurev-orgpsych-032117-104631>
- Hazari, Z., Sonnert, G., Sadler, P. M., & Shanahan, M.-C. (2010). Connecting high school physics experiences, outcome expectations, physics identity, and physics career choice: A gender study. *Physical Review Special Topics—Physics Education Research*, 6(1), 010110. <https://doi.org/10.1103/PhysRevSTPER.6.010110>
- Hazari, Z., Tai, R. H., & Sadler, P. M. (2017). The role of high school physics in the development of engineering identity. *Physical Review Physics Education Research*, 13(1), 010101.
- Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems*, 116(1), 2–20. <https://doi.org/10.1108/IMDS-09-2015-0382>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>

- Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist*, 41(2), 111–127. https://doi.org/10.1207/s15326985ep4102_4
- Honicke, T., & Broadbent, J. (2016). The influence of academic self-efficacy on academic performance: A systematic review. *Educational Research Review*, 17, 63–84. <https://doi.org/10.1016/j.edurev.2015.11.002>
- Howard, J. L., Bureau, J., Guay, F., Chong, J. X. Y., & Ryan, R. M. (2021). Student motivation and associated outcomes: A meta-analysis from self-determination theory. *Perspectives on Psychological Science*, 16(6), 1300–1323. <https://doi.org/10.1177/1745691620966789>
- Huang, X. (2022). Academic self-efficacy and career persistence among engineering students. *Journal of Engineering Education*, 111(3), 512–530. <https://doi.org/10.1002/jee.20424>
- Hurley, A. E., Scandura, T. A., Schriesheim, C. A., Brannick, M. T., Seers, A., Vandenberg, R. J., & Williams, L. J. (1997). Exploratory and confirmatory factor analysis: Guidelines, issues, and alternatives. *Journal of Organizational Behavior*, 18(6), 667–683. [https://doi.org/10.1002/\(SICI\)1099-1379\(199711\)18:6<667::AID-JOB874>3.0.CO;2-T](https://doi.org/10.1002/(SICI)1099-1379(199711)18:6<667::AID-JOB874>3.0.CO;2-T)
- Ibarra, H. (1999). Provisional selves: Experimenting with image and identity in professional adaptation. *Administrative Science Quarterly*, 44(4), 764–791.
- International Labour Organization (ILO). (2020). *Youth employment in Indonesia: Trends and challenges*. International Labour Organization.
- Jaeger, A. J., Thiry, H., & Weston, T. J. (2022). Motivational pathways to STEM identity: Evidence from engineering undergraduates. *International Journal of STEM Education*, 9(1), 45. <https://doi.org/10.1186/s40594-022-00355-4>
- Jiang, H., Zhang, L., & Zhang, W. (2024). Influence of career awareness on STEM career interests: Examining the roles of self-efficacy, outcome expectations, and gender. *International Journal of STEM Education*, 11(1), 22. <https://doi.org/10.1186/s40594-024-00482-7>
- Kemdikbudristek. (2020). *Kebijakan dan Strategi Pembangunan Sumber Daya Manusia Unggul Menuju Indonesia Emas 2045*. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.
- Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, 45(1), 79–122. <https://doi.org/10.1006/jvbe.1994.1027>
- Lent, R. W., Ezeofor, I., Morrison, M. A., Penn, L. T., & Ireland, G. W. (2018). Applying the social cognitive model of career self-management to career exploration and decision-making. *Journal of Vocational Behavior*, 107, 37–48. <https://doi.org/10.1016/j.jvb.2018.03.007>

- Lent, R. W., Lopez, A. M., Lopez, F. G., & Sheu, H. B. (2015). Social cognitive predictors of STEM interest. *Journal of Counseling Psychology*, 62(1), 84–97. <https://doi.org/10.1037/cou0000003>
- Lent, R. W., Sheu, H.-B., & Gloster, C. (2017). Self-efficacy, interests, and career choice goals in engineering students: A test of social cognitive career theory. *Journal of Career Assessment*, 25(3), 443–460.
- Li, Y., & Singh, C. (2025). Physics identity and persistence in STEM pathways: A longitudinal analysis. *Physical Review Physics Education Research*, 21(1), 010104. <https://doi.org/10.1103/PhysRevPhysEducRes.21.010104>
- Litalien, D., & Guay, F. (2015). Dropout intentions in engineering: A test of self-determination theory. *Journal of Vocational Behavior*, 88, 95–104. <https://doi.org/10.1016/j.jvb.2015.02.005>
- Maltese, A. V., & Tai, R. H. (2011). Pipeline persistence: Examining the association of educational experiences with earned degrees in STEM among U.S. students. *Science Education*, 95(5), 877–907. <https://doi.org/10.1002/sce.20441>
- Marra, R. M., Rodgers, K. A., Shen, D., & Bogue, B. (2012). Leaving engineering: A multi-year single institution study. *Journal of Engineering Education*, 101(1), 6–27. <https://doi.org/10.1002/j.2168-9830.2012.tb00039.x>
- Matusovich, H. M., Streveler, R. A., & Godwin, A. (2019). The complexity of engineering student persistence and the role of identity. *Journal of Engineering Education*, 108(1), 127–146.
- Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review*, 1(1), 61–89. [https://doi.org/10.1016/1053-4822\(91\)90011-Z](https://doi.org/10.1016/1053-4822(91)90011-Z)
- Morrow, P. C. (1993). *The measurement of organizational commitment: Development and validation of a new scale*. (Unpublished doctoral dissertation). University of Oklahoma.
- Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology*, 38(1), 30–38.
- Negru-Subtirica, O., & Pop, E. I. (2018). Longitudinal links between career adaptability and academic achievement in adolescence. *Journal of Vocational Behavior*, 106, 25–38. <https://doi.org/10.1016/j.jvb.2017.12.004>
- Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66(4), 543–578. <https://doi.org/10.3102/00346543066004543>
- Patrick, A. D., & Borrego, M. (2016). A review of the literature relevant to engineering identity. *ASEE Annual Conference & Exposition Proceedings*. <https://doi.org/10.18260/p.26174>

- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Potvin, G., & Hazari, Z. (2013). The development and measurement of identity across the physical sciences. In *2013 Physics Education Research Conference Proceedings* (pp. 281–284). American Association of Physics Teachers. <https://doi.org/10.1119/perc.2013.pr.058>
- Potvin, P., & Hasni, A. (2014). Interest, motivation, and attitude towards science and technology at K–12 levels: A systematic review. *Studies in Science Education*, 50(1), 85–129. <https://doi.org/10.1080/03057267.2014.881626>
- Potvin, P., & Hasni, A. (2019). Student interest in science across time. *Science Education*, 103(2), 381–401. <https://doi.org/10.1002/sce.21482>
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891. <https://doi.org/10.3758/BRM.40.3.879>
- Renninger, K. A., & Hidi, S. (2011). Revisiting the conceptualization of interest. *Educational Psychologist*, 46(3), 168–184. <https://doi.org/10.1080/00461520.2011.587723>
- Rittmayer, A. D., & Beier, M. E. (2008). *Overview: Self-efficacy in STEM*. SWE-AWE CASEE Overviews.
- Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, 130(2), 261–288. <https://doi.org/10.1037/0033-2909.130.2.261>
- Rodriguez-Amaya, L., Rivas, J., & Jones, K. (2018). Engineering identity development of undergraduate students: A review of the literature. *International Journal of Engineering Education*, 34(6), 1818–1835.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Saputra, W. S., Hamdani, A., Solehudin, A., & Sucita, T. (2025). STEM interest, engineering-oriented career identity, and academic self-efficacy on engineering study intention: A SEM analysis among senior high school students. *Journal of*

- Environment and Sustainability Education*, 3(2), 304–313.
<https://doi.org/10.62672/joease.v3i2.102>
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2019). Partial least squares structural equation modeling. In H. Latan & R. Noonan (Eds.), *Partial least squares path modeling* (pp. 1–26). Springer. https://doi.org/10.1007/978-3-030-05140-6_1
- Savickas, M. L. (2013). Career construction theory and practice. In R. W. Lent & S. D. Brown (Eds.), *Career development and counseling: Putting theory and research to work* (2nd ed., pp. 147–183). Wiley.
- Schiefele, U. (2009). Situational and individual interest. In K. A. Renninger & S. Hidi (Eds.), *Handbook of research on motivation* (pp. 197–222). Routledge.
- Schunk, D. H. (1982). Effects of attributional feedback on children's perceived self-efficacy and achievement. *Journal of Educational Psychology*, 74(4), 548–556.
- Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social-emotional learning: Theory, research, and practice. *Theory Into Practice*, 59(2), 142–151.
<https://doi.org/10.1080/00405841.2020.1716919>
- Schwab, K. (2016). *The fourth industrial revolution*. Crown Business.
- Sheppard, S., Macatangay, K., Colby, A., & Sullivan, W. M. (2020). Engineering pathways and persistence. *Journal of Engineering Education*, 109(2), 163–186.
<https://doi.org/10.1002/jee.20312>
- Sheu, H.-B., Lent, R. W., Brown, S. D., Miller, M. J., Hennessy, K. D., & Duffy, R. D. (2019). Cultural variations in STEM career persistence: Testing identity mediation. *Journal of Counseling Psychology*, 66(2), 171–185.
<https://doi.org/10.1037/cou0000328>
- Sullivan, S. E., & Baruch, Y. (2009). Advances in career theory and research: A critical review and agenda for future exploration. *Journal of Management*, 35(6), 1542–1571. <https://doi.org/10.1177/0149206309350082>
- Syed, M., Azmitia, M., & Cooper, C. R. (2011). Identity and academic persistence among college students. *Developmental Psychology*, 47(4), 1295–1309.
<https://doi.org/10.1037/a0023839>
- Tai, R. H., Liu, C. Q., Maltese, A. V., & Fan, X. (2006). Planning early for careers in science. *Science*, 312(5777), 1143–1144.
<https://doi.org/10.1126/science.1128690>
- Taheri, S., & Parsa, A. (2022). Academic self-efficacy and persistence in engineering programs: The mediating role of motivation. *International Journal of STEM Education*, 9(1), 77. <https://doi.org/10.1186/s40594-022-00357-2>
- Tomlinson, M. (2017). Forms of graduate capital and their relationship to graduate employability. *Education + Training*, 59(4), 338–352.
<https://doi.org/10.1108/ET-05-2016-0090>

- Tonso, K. L. (2006). Student engineers and engineer identity: Campus engineer identities as figured world. *Cultural Studies of Science Education*, 1(2), 273–307. <https://doi.org/10.1007/s11422-005-9009-2>
- Tonso, K. L. (2014). *The formation of engineering identity: A longitudinal study of engineering students*. (Unpublished doctoral dissertation). University of California, Berkeley.
- Tracer Study UPI. (2022). *Laporan tracer study Universitas Pendidikan Indonesia*. Universitas Pendidikan Indonesia.
- Tremblay, M. A., Blanchard, C. M., Taylor, S., Pelletier, L. G., & Villeneuve, M. (2017). Work extrinsic and intrinsic motivation scale: Its value for organizational psychology research. *Journal of Organizational Behavior*, 20(2), 213–236. [https://doi.org/10.1002/\(SICI\)1099-1379\(199905\)20:2<213::AID-JOB884>3.0.CO;2-5](https://doi.org/10.1002/(SICI)1099-1379(199905)20:2<213::AID-JOB884>3.0.CO;2-5)
- UN. (2015). *Transforming our world: The 2030 agenda for sustainable development*. United Nations.
- Usher, E. L., & Schunk, D. H. (2021). Sources of self-efficacy in education revisited: Implications for measurement and practice. *Contemporary Educational Psychology*, 71, 102030. <https://doi.org/10.1016/j.cedpsych.2021.102030>
- Vallerand, R. J., Pelletier, L. G., Blais, M. R., Brière, N. M., Senécal, C., & Vallières, E. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement*, 52(4), 1003–1017.
- Verdín, D. (2021). Engineering identity formation: A longitudinal analysis. *Journal of Engineering Education*, 110(2), 399–422. <https://doi.org/10.1002/jee.20397>
- Verdín, D., Godwin, A., & Morazes, J. (2020). First-generation engineering students and identity development. *ASEE Annual Conference & Exposition Proceedings*. <https://doi.org/10.18260/1-2--35164>
- Vignoles, V. L., Schwartz, S. J., & Luyckx, K. (2017). Identity and motivation: Understanding self in context. *Psychological Review*, 124(4), 465–497. <https://doi.org/10.1037/rev0000060>
- Walther, J., Sochacka, N. W., & Kellam, N. N. (2021). Engineering education and professional identity: Trends and future research directions. *Journal of Engineering Education*, 110(1), 43–65. <https://doi.org/10.1002/jee.20375>
- Wang, M. (2015). The role of STEM interest and self-efficacy in STEM career choice: A meta-analysis. *Journal of Career Assessment*, 23(1), 12–28.
- Wang, M. T., & Degol, J. L. (2017). Gender gap in STEM: Current knowledge, implications for practice, policy, and future directions. *Educational Psychology Review*, 29(1), 119–140. <https://doi.org/10.1007/s10648-015-9355-x>

- Wang, M. T., Degol, J. L., & Ye, F. (2015). Math achievement is important, but task values are critical, too: Examining the intellectual and motivational factors influencing STEM career choice. *Child Development*, 86(2), 187–204. <https://doi.org/10.1111/cdev.12272>
- Wang, M. T., Ye, F., & Degol, J. L. (2021). Longitudinal pathways of STEM motivation and identity. *Journal of Youth and Adolescence*, 50(6), 1145–1162. <https://doi.org/10.1007/s10964-020-01348-2>
- Wang, X., Zhang, J., & Zhao, X. (2023). Academic self-efficacy, STEM motivation, and career commitment among engineering students. *International Journal of STEM Education*, 10(1), 11. <https://doi.org/10.1186/s40594-023-00423-8>
- World Bank. (2018). *The changing nature of work*. World Bank Publications.
- Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82–91. <https://doi.org/10.1006/ceps.1999.1016>
- Zimmerman, B. J., & Schunk, D. H. (2001). *Self-regulated learning and academic achievement: Theoretical perspectives*. Lawrence Erlbaum Associates.
- Zhou, M., Li, Q., & Wang, J. (2021). Organizational support and career commitment in STEM professions. *Journal of Career Development*, 48(5), 507–521. <https://doi.org/10.1177/0894845320903520>