ORIGINAL ARTICLE

Servant leadership for sustainability in higher education: policy implications based on ethical behavior and conceptual skills of scholars with science-related backgrounds

Majid Ghasemy[1]

Abstract

Sustainable service-led universities actively promote sustainability initiatives and service provision. In this context, servant leadership is relevant for higher education, since it ensures sustainable performance over time, encourages the idea of serving stakeholders (e.g., students, staff, and beyond), and is in alignment with the concept of turnaround leadership for sustainability in higher education (TLSHE). However, with few exceptions, the topic of servant leadership for sustainability in higher education is under-researched so far. Our study contributes to closing this research gap by examining the impact of behaving ethically and conceptual skills, as two of servant leadership's dimensions that are closely related to the interpersonal and intellectual capability dimensions of TLSHE, on three outcomes, namely job satisfaction, affective commitment, and work motivation. Due to the implementation of higher education harmonization policies in Southeast Asia, we focus on Malaysia, as a well-established educational hub in this region, and use a sample of 449 academics with science-related backgrounds. These scholars play an important role in achieving a few of the sustainable development goals (SDGs) as well as in dealing with societies' present and future demands through educating students in STEM areas. We find support for the servant leadership dimensions' role in explaining and predicting work motivation via job satisfaction and affective commitment. Subsequently, we discuss the findings' practical implications and provide recommendations for future research in this area.

Keywords Sustainability · Higher education · Job satisfaction · Affective commitment · Work motivation · PLS-SEM · Malaysia

1 Introduction

With the launch of the sustainable development goals (SDGs) in 2015, universities as the growth machines of economy and technology in developing countries (Wan et al., 2020), had to more comprehensively address present and future settings in the context of social

✉ Majid Ghasemy
   majid.ghasemy@usm.my

1   National Higher Education Research Institute (IPPTN), Universiti Sains Malaysia (USM), Penang, Malaysia

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well-being and sustainability (Ghasemy et al., 2021c). In this context, STEM (science, technology, engineering, and mathematics) education in relation to sustainable development has gained particular attention in higher education research (Khadri, 2022). Sustainable development includes addressing complex problems on the environmental, social, economic, political, or cultural level (Risopoulos-Pichler et al., 2020) and people from different disciplines are needed to address these issues sufficiently (Steiner & Posch, 2006) through multidisciplinary research. Implementing education for sustainable development in higher education is essential to enable a transition toward such goals (Weiss et al., 2021), which could be done through implementing related policies and practices in various initiatives (Franco et al., 2019). Examples could be participating in the Times Higher Education SDG Impact Rankings (Ghasemy, Elwood, & Scott, 2022c), conveying structure and values (Ferrero-Ferrero et al., 2018), and developing graduates, who are knowledgeable of sustainability, inventive, and capable of implementing change (Ghasemy, Elwood, & Scott, 2022c). Furthermore, leadership is one of the main drivers for higher education's sustainability (Azizi, 2022; Scott et al., 2012; Ghasemy et al. 2024a). Therein, turnaround leadership for sustainability in higher education (TLSHE) acknowledges the challenges related to systemic change faced by institutions of higher learning as they wrestle with addressing the four pillars of social, cultural, economic, and environmental sustainability in key activities, such as research, engagement, and operations (Mader et al., 2013; Scott et al., 2012).

Hence, fostering leadership behaviors, that encourage and facilitate sustainable transitions, at different levels of higher education institutions is important (Azizi, 2022). However, in this process, the role of informal/intellectual leaders (e.g., senior academics without formal positions), who are resourceful in utilizing their experience, networks, and intellectual capacity, should not be neglected (Evans, 2017). Formal leaders are usually found within the management sphere to serve organizational interests (institutional interests in our case) (Andersen, 2009), while informal leaders do not hold formal positions but are seen as intellectual/academic leaders (Evans, 2017; Macfarlane, 2011).

Leadership in higher education is different from the one in other sectors (Latif et al., 2021) and has been increasingly recognized as being an interesting topic (Alonderiene & Majauskaite, 2016). Good leadership expresses itself in helping employees communicate and collaborate, while finding meaning in their work (Tang et al., 2013). To do so, leaders need to inherit hard skills, but more importantly soft skills, which include rational as well as emotional elements (Tang et al., 2013). Academic leaders, who understand the organizational culture's complexity, can utilize their available resources and more effectively manage/mentor the supervised staff, which can, in turn, lead to increased job satisfaction and work motivation (Machado-Taylor et al., 2016). Among the several leadership approaches available, servant leadership is often regarded as being superior, since it can generally explain more variance in important outcomes than ethical, authentic, or transformational leadership (Hoch et al., 2018; Liden et al., 2008). In addition, it offers an effective educational leadership and management paradigm for modern educational institutions with one viable leadership doctrine (i.e., first to serve, then to lead) (Crippen, 2004). Given the challenges faced by leaders in universities (e.g., sustainability challenges (Hart et al., 2015)), the concept can induce a significant progress in governance and administration (Wheeler, 2012).

The term servant leader was coined in the 1970s by Greenleaf (1970), and the principles of servant leadership for higher education were introduced by Wheeler (2012) a decade ago. Servant leaders are credible role models within their workplaces (Schwarz et al., 2016), provide employees with career development guidance, and have a positive impact on their attitudes, behaviors, and performance (Panaccio et al., 2015). This concept's aspects

are consistent with effective turnaround leadership qualities, such as interrelated interpersonal and intellectual capabilities (Fullan & Scott, 2009) that are, moreover, required for sustainability in higher education (Scott et al., 2012). In this sense, servant leaders, in their effort to create high performing workers and teams, initiate goals to stimulate a sustainable learning curve (Stouten & Liden, 2020) and focus on sustainable performance over time (Eva et al., 2019), thereby ensuring that universities are also sustainably functioning in the long term.

Though the concept of servant leadership can be applied to several sectors (Abbas et al., 2020), until today, there is still a dearth of empirical research on servant leadership behaviors in academic institutions (Ghasemy et al., 2022a; Latif et al., 2021), especially on its different dimensions (Ghasemy, Mohajer, et al., 2021b). In this study, we are particularly interested in examining servant leadership's influence on important organizational outcomes, which are job satisfaction, organizational commitment, and work motivation, by considering tenure as a covariate. While job satisfaction has been studied fairly often (Alonderiene & Majauskaite, 2016), organizational commitment (Huang et al., 2020) and work motivation (Rao, 2016), especially in the connection to servant leadership, remain relatively unexplored topics.

Against this background, our study aims at answering the following research question: *To what extent do academics' selected servant leadership behaviors directly and indirectly influence their work motivation?* In this context, we examine the impact of two dimensions of servant leadership, namely behaving ethically and conceptual skills. The different dimensions of the multifaceted servant leadership are moderately related to one another in general (Liden et al., 2008) and in the context of higher education in particular (Ghasemy et al., 2022b). However, we only considered behaving ethically and conceptual skills, due to their consistency with the interrelated interpersonal and intellectual leadership capabilities, as two of the required leadership qualities for sustainability in higher education (Ghasemy, Elwood, & Scott, 2022c; Scott et al., 2012). Furthermore, these behaviors can be exhibited by anyone, including formal and informal academic leaders.

To answer our research question, we used a sample of academics with science-related backgrounds in the Malaysian higher education sector and applied partial least squares structural equation modeling (PLS-SEM) (Ghasemy et al. 2020). We particularly chose this population due to their important role in facilitating the achievement of a few SDGs that are related to STEM education, such as SDG 6 (clean water and sanitation), SDG 7 (affordable and clean energy), SDG 9 (industry, innovation, and infrastructure), and SDG 12 (responsible consumption and production). The higher education sector in Malaysia has undergone several reforms and is now ranked worldwide based on quality research, teaching, and learning (Amzat et al., 2022). Hence, also the academic profession in Malaysia has changed, in that academics now teach mass classes, are in charge of administration and management, contribute to industry, economy, and society, and need an entrepreneurial mindset (Wan et al., 2015). Notably, as reported by Wan and Doria (2021), Malaysia along with Germany were identified through an international study conducted by the British Council in 2016 as two countries with the most balanced portfolio of national policies to support international higher education in four domains, namely sustainability, access, openness and mobility, as well as quality assurance and degree recognition.

Our results show that behaving ethically and conceptual skills have small influences on affective commitment, while having a larger impact on job satisfaction and work motivation. In addition, we find a large effect from job satisfaction on affective commitment. Thereby, we also note that job satisfaction and affective commitment play mediating roles in the relationships between the servant leadership dimensions and work motivation.

Finally, we observe a relationship between tenure and work motivation, which shows that the higher the level of academics' tenure (duration of service in the current position), the lower the level of their work motivation. Consequently, our article offers the following main contributions: 1) we focus on behaving ethically and conceptual skills as two dimensions of servant leadership, 2) we examine lecturers with science-related backgrounds as key players in facilitating the achievement of selected SDGs, 3) we provide an outlook on how these servant leadership behaviors enhance desirable organizational outcomes in academic settings, and 4) we offer data-driven and evidence-based relevant policy recommendations using the importance/performance map analysis (IPMA) (Ringle & Sarstedt, 2016).

The rest of the paper is structured as follows: First, we postulate our hypotheses based on a review of the theory and practice of servant leadership after which we introduce our methodology and results. We then discuss our findings and their implications and conclude by addressing this study's limitations and recommending avenues for future research.

1.1 Theoretical framework and hypotheses development

A diverse set of theories underpin the research regarding servant leadership (Eva et al., 2019). For instance, concordant with the social exchange theory (Blau, 2017), the servant leaders' focus is on growth and development of the followers who, consequently, feel obliged to reciprocate their leaders' behaviors with positive actions. In addition, the social identity theory (Tajfel, 1978) explains how servant leaders develop strong relationships with followers, thus making employees feel like partners in the organization. Servant leadership itself means taking the place of a servant to others, while a general and agreed definition is not available (Andersen, 2009). Based on the servant leadership philosophy, a leader has different functions, such as (1) serving others in the management process, (2) helping followers to develop, (3) training followers to be exceptional service providers, and (4) benefiting the organization (Bande et al., 2016; Eva et al., 2019). Most importantly, servant leaders place followers' needs and satisfaction before their own, thereby shaping a climate in which the subordinates feel great as well as inspired to do and create more (Chiniara & Bentein, 2016). Those leaders facilitate and encourage shared decision making in the organization and respectfully listen to concerns (Franco & Antunes, 2020). In our study, we examine the extent to which academics' selected servant leadership behaviors, namely behaving ethically and conceptual skills, contribute to work motivation through job satisfaction and affective commitment.

The two servant leadership's dimensions used in our study are particularly important to practice turnaround leadership (Fullan & Scott, 2009) and to promote sustainability (Ghasemy, Elwood, & Scott, 2022c; Scott et al., 2012) in higher education. According to Liden et al. (2008), behaving ethically is mainly related to holding ethical standards, being honest, and valuing honesty more than profits and success, which are consistent with academic leadership's interpersonal capability indicators (Fullan & Scott, 2009; Ghasemy, Elwood, & Scott, 2022c; Scott et al., 2012). Problem identification, solving complex problems through creative ideas, and clarity about organizational goals, are the main manifestations of conceptual skills, which are in alignment with academic leadership's intellectual capability indicators (Fullan & Scott, 2009; Ghasemy, Elwood, & Scott, 2022c; Scott et al., 2012).

Motivation is a drive that pushes an individual to act and perform specific tasks and actions (Sharma & Srivastava, 2019). Commitment occurs when employed scholars
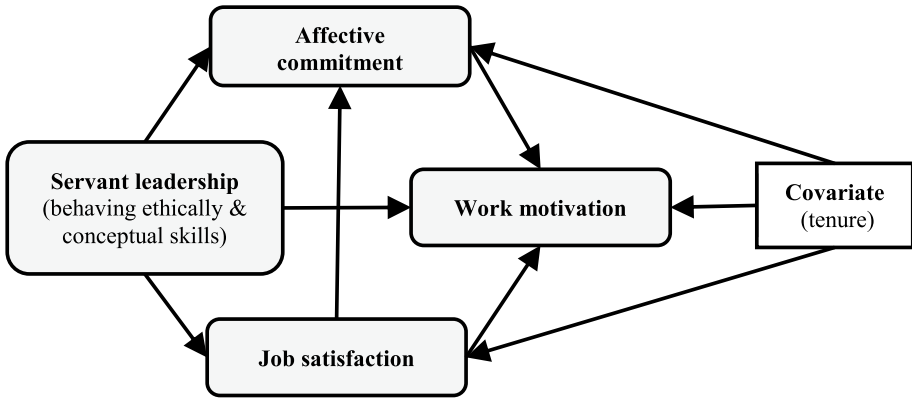
H1(+): Behaving ethically→Work motivation
H2(+): Conceptual skills→Work motivation
H3(+): Behaving ethically→Affective commitment→Work motivation
H4(+): Conceptual skills→Affective commitment→Work motivation
H5(+): Behaving ethically→Job satisfaction→Work motivation
H6(+): Conceptual skills→Job satisfaction→Work motivation
H7(+): Behaving ethically→Job satisfaction→Affective commitment→Work motivation
H8(+): Conceptual skills→Job satisfaction→Affective commitment→Work motivation

Fig. 1 Theoretical framework

internalize the university's values (Weiherl & Frost, 2016). Overall academic job satisfaction is strongly related to the intrinsic aspects of academic work, such as teaching or performing research (Padilla-González & Galaz-Fontes, 2015). According to Johnsrud and Rosser (2002), organizational theorists posit commitment and job satisfaction as intermediate variables, influenced by the way academics experience the organization. In addition, we added tenure to our model as one of the widely used control variables in organizational research (Bernerth & Aguinis, 2016). Figure 1 presents our theoretical framework.

1.2 Behaving ethically and conceptual skills' impact on work motivation

Several research studies examined the impact of servant leadership behaviors on work motivation (e.g., Bande et al. (2016) and Shim and Park (2019)). Nevertheless, our focus in this study is on two servant leadership's dimensions, namely behaving ethically and conceptual skills (Liden et al., 2008). Ouakouak et al. (2020), for example, found evidence for the impact of ethical behaviors on motivation. Shareef and Atan (2019) noted evidence for the effect of ethical behaviors on intrinsic motivation in the context of higher education. Moreover, there are empirical findings for the association between different types of skills and motivation (e.g., Morgan and Fuchs (2007)). Given the multifaceted nature of the servant leadership concept and the moderate-level correlation between these dimensions (Ghasemy et al., 2022b; Liden et al., 2008), we propose the following two hypotheses:

H1 Behaving ethically positively influences work motivation.

H2 Conceptual skills positively influence work motivation.

1.3 Behaving ethically and conceptual skills' impact on motivation through affective commitment

Organizational commitment is a concept that can help explain employees' work behaviors (Meyer & Herscovitch, 2001). In academic environments, commitment evolves when academics adopt the work and organizational values in university settings (Weiherl & Frost, 2016). In this study, we focus on affective commitment (Meyer & Allen, 1991) as the most researched type of organizational commitment (Mercurio, 2015).

Several studies suggest servant leadership's contribution to organizational commitment (e.g., Schneider and George (2011)). In addition, Neubert et al. (2009) found evidence for the direct and indirect effect of ethical behaviors on affective commitment. While emotional intelligence is closely related to cognitive or conceptual skills (Uhl-Bien et al., 2014), it is also positively related to commitment (Nikolaou & Tsaousis, 2002). Drawing on the reviewed literature and the effects of servant leadership's dimensions on work motivation, we propose the following two mediation hypotheses:

H3 Affective commitment positively mediates the relationship between behaving ethically and work motivation.

H4 Affective commitment positively mediates the relationship between conceptual skills and work motivation.

1.4 Behaving ethically and conceptual skills' impact on motivation via job satisfaction

Job satisfaction, as another organizational outcome, is an individual's evaluative judgment about the job, which is different from, but influenced by, a person's perceived emotions (Weiss & Beal, 2005; Weiss & Cropanzano, 1996). Moreover, job satisfaction is further related to a diverse set of desirable outcomes in organizational settings (Saari & Judge, 2004).

Research has empirically supported servant leadership behaviors' impact on job satisfaction (e.g., Schneider and George (2011)). Ethical behavior as well as supporting it are positively associated with job satisfaction (Brown et al., 2005; Chye Koh & Boo, 2004; Neubert et al., 2009), which Ghasemy et al., (2022a) also noted in the higher education context. Moreover, Guchait et al. (2016) investigated behavioral integrity's impact on job satisfaction. In addition, Megheirkouni (2018) found an effect from servant leadership's conceptual skills on intrinsic job satisfaction in the events sector of the Arab Middle East. Therefore, in line with previous research findings, we postulate the following two hypotheses:

H5 Job satisfaction positively mediates the relationship between behaving ethically and work motivation.

H6 Job satisfaction positively mediates the relationship between conceptual skills and work motivation.

1.5 The serial mediation via affective commitment and job satisfaction

Both mediators, job satisfaction and affective commitment, capture a subjective assessment of how people experience and relate to their work (Judge et al., 2017). There have been many attempts to define the relationship between job satisfaction and organizational commitment without reaching an agreement, though most results emphasize that job satisfaction is a precursor of organizational commitment (Saridakis et al., 2020). Higher levels of motivation have been considered as a positive outcome of job satisfaction (Sledge et al., 2008) and in other words, job satisfaction is important in revitalizing staff motivation and in keeping their enthusiasm alive (Machado-Taylor et al., 2017).

Ocen et al. (2017) found empirical evidence for the contribution of employees' job satisfaction on organizational commitment in the banking sector of Uganda. In addition, Chordiya et al. (2017), focusing on state employees in the US and federal public managers in India, observed that job satisfaction has a significant positive impact on affective organizational commitment in both national contexts. Last, in another study conducted in Serbia, Ćulibrk et al. (2018) identified job satisfaction as a significant predictor of employees' organizational commitment.

With this review on servant leadership outcomes and given the evidence for the decisive role of job satisfaction (Machado-Taylor et al., 2016, 2017; Sledge et al., 2008) and organizational commitment (Huang et al., 2020; Kim et al., 2016) in facilitating motivation, we postulate the last mediation hypotheses as follows:

H7 Job satisfaction and affective commitment positively mediate the relationship between behaving ethically and work motivation.

H8 Job satisfaction and affective commitment positively mediate the relationship between conceptual skills and work motivation.

2 Method

2.1 Research design and analytic approach

To analyze the theoretically established model with our empirical data, we used partial least squares structural equation modeling (PLS-SEM). PLS-SEM is a causal-predictive methodology (Sarstedt, Hair, & Ringle, 2022b; Wold, 1982) for estimating the strength of the explanatory constructs' influence on the target construct in a path model (Hair et al., 2022). PLS-SEM has gained increasing interest in several research areas, such as higher education (Ghasemy et al., 2020), international business and management (Richter et al., 2022), and marketing (Sarstedt et al., 2022a). This method allows us to test a complex theoretical model which includes mediation effects (Sarstedt et al., 2020a), run complementary robustness checks such as the analysis of nonlinear effects (Sarstedt et al., 2020b), and analyze the model's predictive power (Legate et al., 2022). Further, the importance/performance map analysis (IPMA) supports us in identifying key areas of relevance for managerial activities' future improvement (Ringle & Sarstedt, 2016). For the model estimation and results analysis, we follow the guidelines by Ghasemy et al. (2020). We employed the SmartPLS 4 software to conduct our analysis (Ringle et al., 2022).

2.2 Measures and covariates

Each construct displayed in the theoretical model (Fig. 1) uses a reflective multi-item measurement model, which we derived from prior research. With respect to behaving ethically and conceptual skills, as two of servant leadership behaviors' dimensions, we used the four-item scales developed by Liden et al. (2008). Regarding job satisfaction, we used the generic 10-item scale by Macdonald and Macintyre (1997). Affective commitment was measured using the six-item scale by Rhoades et al. (2001). The respondents rated the items of these four measures using a five-point symmetric and equidistant Likert scale ranging from 1 (totally disagree) to 5 (totally agree). Last, we measured work motivation using the 11-item scale developed by Robinson (2004) and another five-point symmetric and equidistant Likert scale to rate the items from 1 (totally demotivated) to 5 (totally motivated). Table A1 in the Online Appendix shows the items of the final validated model with their selected descriptive statistics. We also introduced tenure to our proposed model as a covariate to handle endogeneity (Hult et al., 2018).

2.3 Sample and population

The population in our study consists of academics with science-related backgrounds due to their vital roles in dealing with societies' present and future demands through educating students in, for example, STEM areas. Many international and national-level programs, policies, and projects highlight that the jobs of tomorrow require a greater emphasis on STEM [as examples see the UNESCO's SAGA Project at https://en.unesco.org/saga or the Malaysian education blueprint higher education (MEBPHE) 2015–2025]. Also literature supports the importance of STEM in enhancing sustainable development (Teh & Koh, 2020), sustainability education development (Nguyen et al., 2020), or developing students into competent problem solvers of the future (Khadri, 2022).

We sent our survey to 31,493 Malaysian academics using the Survey Monkey platform to collect the data. Overall, through a simple random sampling method, we received 2040 surveys (response rate = 6.47%) of which 76 surveys had been insufficiently completed. Thus, we removed them from our data. Thereby our final sample size was $N = 1964$. Since our study's focus was on scholars with science-related backgrounds, we only focused on $N = 456$ lecturers, who had self-reported their area of study/research as being science-related. Since less than 5% of values were missing per indicator in our final dataset, we replaced the missing values with the indicators' median score, which is in line with the arguments made by Tabachnick and Fidell (2013). For data screening, we specified and estimated our model using the EQS 6.4 statistical package (Bentler, 2006; Bentler & Wu, 2018). We detected and removed seven multivariate outliers with the highest contribution to the normalized estimate of multivariate kurtosis (Yuan et al., 2004). Removing the outlying cases reduced the normalized estimate of multivariate kurtosis from 63.51 to 51.81, a value greater than three and, therefore, indicative of our data's multivariate non-normal nature (Bentler, 2006). Table 1 presents the final sample's demographic profile consisting of $N = 449$ academics.[1]

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[1] This dataset has partially been used in Ghasemy et al. (2022) before.

Table 1 Demographic profile of the participants ($N = 449$)

Variable	Frequency	Percent
Gender		
Male	153	34.1
Female	296	65.9
Age		
Under 30	11	2.4
31–40	196	43.7
41–50	146	32.5
51–60	76	16.9
Above 60	20	4.5
Marital status		
Single	94	20.9
Married	355	79.1
Academic rank		
Professor	44	9.8
Associate professor	81	18.0
Assistant professor/senior lecturer	203	45.2
Lecturer	84	18.7
Other	37	8.2
Current tenure		
Below 2 years	68	15.1
2 to 4 years	91	20.3
4 to 6 years	54	12.0
Over 6 years	236	52.6
Leadership position		
Yes	102	22.7
No	347	77.3
University type		
Public university	358	79.7
Public polytechnic	22	4.9
Community college	8	1.8
Private university	37	8.2
Private university college	19	4.2
Public institution	5	1.1
Experience outside higher education		
Yes	237	52.8
No	212	47.2

3 Results

To assess the measurement models, we focused on the factor loadings, the construct reliability (i.e., by assessing Cronbach's alpha, ρ_A, and the composite reliability), and the construct's average variance extracted (AVE) to determine the convergent validity (Ghasemy et al. (2020). Therein, Cronbach's alpha can be regarded as a more conservative value, while the composite reliability is more liberal in nature (Sarstedt, Hair, & Ringle, 2022b).

Hence, when examining our measurement models, we relied on the compromise, which is the reliability coefficient ρ_A. In addition, we examined the discriminant validity by means of the heterotrait–monotrait (HTMT) ratio (Franke & Sarstedt, 2019; Henseler et al., 2015). Within this test, the values should be lower than 0.90, or preferably below the more conservative threshold of 0.85 (Sarstedt, Hair, & Ringle, 2022b). We also provide substantial evidence for the measurement models' reliability and validity by conducting a bootstrap-based inference test.

We found that each reflective measurement model has indicator loadings that are very close to or above the recommended threshold of 0.708. All construct reliability values are greater than 0.7 and below 0.95 and, therefore, satisfactory. Also, the AVE values are above the recommended threshold value of 0.5. We provide the detailed statistics (including one-sided percentile confidence intervals) of our evaluation in Table A2 (Online Appendix), indicating the fulfillment of all the quality criteria to assess reflective measurement models. For the HTMT values, we found that the upper bounds of the one-sided 95% confidence intervals are below 0.90. Since all HTMT values are significantly lower than this threshold, we concluded that discriminant validity has been established based on the HTMT$_{0.90}$ criterion (Hair et al., 2022). We show the detailed statistics and the one-sided percentile confidence intervals related to the discriminant validity assessment in Table A3 (Online Appendix).

To evaluate the structural model, we considered the inner VIF values for collinearity assessment, the path coefficients' statistical significance (and practical relevance), the outcome variables' R^2 values, the f^2 effect sizes, and the model's out-of-sample predictive power. As presented in Table 2, collinearity is not a matter of concern, since all the VIF statistics are ideally below 3. In terms of in-sample explanatory power, the appropriateness of the R^2 values depends on the study's context (Sarstedt, Hair, & Ringle, 2022b). The R^2 value for job satisfaction is 0.128, for affective commitment it is 0.533, and for work motivation it is 0.460. Examples of R^2 values for our outcome variables that we found in other higher education studies are 0.204 for job satisfaction (Ghasemy et al., 2022a), 0.520 for affective commitment (Nazir & Islam, 2017), and 0.265 for academic motivation (Ghasemy & Elwood, 2022). In addition, all the direct and indirect paths between the latent variables are statistically significant on a 5% probability of error level. We used the one-tailed percentile bootstrapping results with 10,000 subsamples to receive the significance levels of the path coefficients (Becker et al., 2022; Streukens & Leroi-Werelds, 2016).

With respect to their relevance, we observed that the paths running from the servant leadership dimensions—behaving ethically ($\beta = 0.074$) and conceptual skills ($\beta = 0.087$)—to affective commitment, though significant, do not seem to be highly relevant due to the small sizes of the path coefficients and low f^2 values. On the other hand, the paths leading from behaving ethically ($\beta = 0.215$) and conceptual skills ($\beta = 0.203$) to job satisfaction show more relevance. Importantly, we found that the path coefficient leading from job satisfaction to affective commitment ($\beta = 0.670$) is the largest of the effects. Regarding work motivation, we identified three out of four constructs, namely behaving ethically ($\beta = 0.252$), conceptual skills ($\beta = 0.269$), and affective commitment ($\beta = 0.256$), as equally good predictors of work motivation. Given the statistical significance of the paths running from the servant leadership dimensions to work motivation, we managed to find empirical evidence for H1 and H2. Furthermore, we observed that job satisfaction is a relatively weaker predictor of work motivation with a path coefficient of $\beta = 0.135$. In addition, the two-tailed significance testing for the assessment of the relationships between the control variable and the other variables in our model showed a significant and negative relationship ($\beta = -0.082$) between tenure and work motivation. Focusing on the entire

Table 2 Structural model evaluation results

Outcome	Predictor	Path/hypothesis	β	Confidence interval	p value	f^2 effect size	Variance inflation factor (VIF)
OC ($R^2 = 0.533$)							
	BE	BE→OC	0.074	[0.015, 0.136]	0.021	0.009	1.315
	CS	CS→OC	0.087	[0.015, 0.160]	0.024	0.012	1.306
	JS	JS→OC	0.670	[0.608, 0.727]	$p < 0.001$	0.838	1.147
	Tenure	Tenure→OC	−0.026	[−0.084, 0.034]	0.197	0.001	1.004
JS ($R^2 = 0.128$)							
	BE	BE→JS	0.215	[0.136, 0.298]	$p < 0.001$	0.042	1.262
	CS	CS→JS	0.203	[0.119, 0.289]	$p < 0.001$	0.038	1.258
	Tenure	Tenure→JS	0.022	[−0.070, 0.111]	0.321	0.001	1.004
WM ($R^2 = 0.460$)							
	BE	H1(+): BE→WM	0.252	[0.181, 0.328]	$p < 0.001$	0.088	1.327
	CS	H2 (+): CS→WM	0.269	[0.192, 0.345]	$p < 0.001$	0.101	1.322
	OC	OC→WM	0.256	[0.162, 0.353]	$p < 0.001$	0.057	2.139
	JS	JS→WM	0.135	[0.028, 0.238]	0.017	0.016	2.108
	Tenure	Tenure→WM	−0.082	[−0.146, −0.017]	0.007	0.012	1.005
		H3(+): BE→OC→WM	0.019	[0.004, 0.037]	0.032		
		H4(+): CS→OC→WM	0.022	[0.004, 0.046]	0.042		
		H5(+): BE→JS→WM	0.029	[0.006, 0.055]	0.027		
		H6(+): CS→JS→WM	0.027	[0.005, 0.054]	0.034		
		H7(+): BE→JS→OC→WM	0.037	[0.019, 0.059]	0.001		
		H8(+): CS→JS→OC→WM	0.035	[0.017, 0.055]	0.001		

BE = Behaving ethically; CS = Conceptual skills; JS = Job satisfaction; OC = Organizational affective commitment; WM = Work motivation; values in rectangular brackets = 95% bootstrap confidence intervals using the percentile approach and 10,000 subsamples

model and following the standards set by Cohen (1988) for the effect sizes evaluation (i.e., 0.02 = small, 0.15 = medium, and 0.35 = large), our results showed that job satisfaction's effect size on affective commitment was very large and the rest was relatively small to medium in size. Finally, regarding the mediation assessment, all the six hypotheses were empirically supported. More specifically, the type of the mediation effects, represented by H3 to H8, was a complementary partial mediation, since the direct and indirect effects were significant and pointed in the same direction (Hair et al., 2022).

As the model assessment's last step, we considered the model's out-of-sample predictive power. For this purpose, we ran the PLS_predict analysis (Shmueli et al., 2019) with the default settings (10 folds and 10 repetitions) and focused on work motivation as the key target construct. All the $Q^2_{predict}$ values were above zero and the root mean square error (RMSE) statistics of almost all items in the PLS results section were smaller (one was equal) than the RMSE values of the linear model (LM). Consequently, we concluded the proposed model's out-of-sample predictive performance to be high (Shmueli et al., 2019). We show the detailed PLS_predict results in Table A4 (Online Appendix). We also considered the cross-validated predictive ability test (CVPAT) (Liengaard et al., 2021; Sharma et al., 2022) as a means of predictive model assessment. In doing so, we focused on the
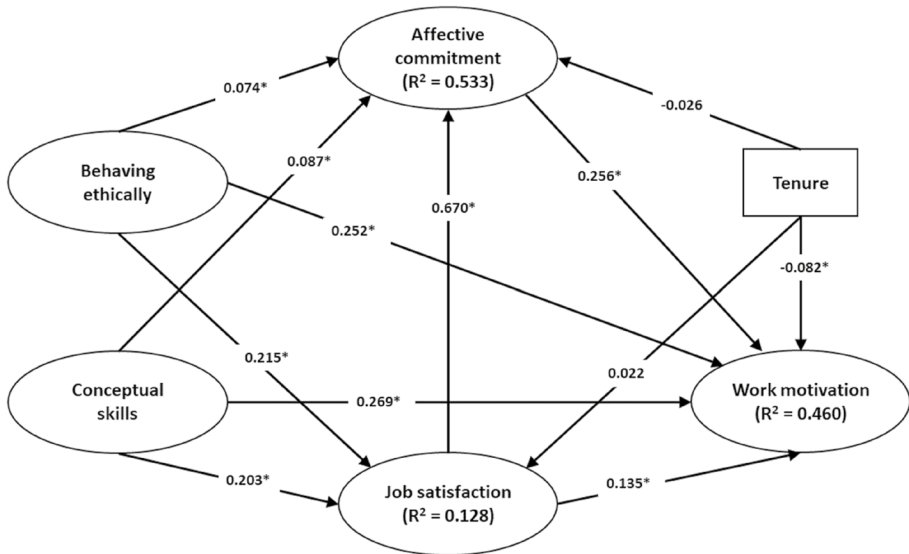
Fig. 2 The final validated model

target construct in our model and followed the guidelines proposed by Sharma et al. (2022) to interpret the results. We observed that the average loss of our model was significantly smaller than the naïve indicator-averages (IA) benchmark, providing further indication that our model has predictive ability.

Figure 2 shows the final model with factor loadings, path coefficients, and the endogenous constructs' R^2 values within the proposed model with the significant path coefficients ($p < 0.05$) displayed with asterisks.

Upon completion of the structural model evaluation and hypotheses testing, we rounded our main results up by doing a robustness check (Sarstedt et al., 2020b). Specifically, we examined the relationships among the constructs in terms of linearity. Therefore, we focused on quadratic effects among the latent variables in our model. The two-tailed percentile bootstrapping test results at a 5% significance level with 10,000 bootstrap subsamples imply the model's robustness, since none of the quadratic effects are statistically significant (see Table A5 in the Online Appendix for details).

Finally, given the mixed results from previous empirical studies on gender differences in behaviors and attitudes (e.g., Ghasemy & Elwood, 2022; Ghasemy et al., 2022a, 2022d), we extended our main structural model evaluation results by performing a permutation-based multigroup analysis (Chin & Dibbern, 2010). To do so, we first established partial measurement invariance of composite models (MICOM) in line with the procedure by Henseler et al. (2016) (Table A6 in the Online Appendix). The results based on a two-tailed permutation test with 5000 permutations at a 5% significance level indicated no significant gender differences in terms of the direct relationships regarding the constructs in our model (Table A7 in the Online Appendix). This finding strengthens the generalizability of our model and results.

4 Discussion

4.1 Theoretical implications

From a theoretical perspective, we developed and validated a model that explains the extent to which two dimensions of servant leadership behaviors practiced by the scholars with science-related backgrounds contribute to the desired outcomes. More specifically, our study found evidence for behaving ethically and conceptual skills' impact on three organizational outcomes, namely affective commitment, job satisfaction, and work motivation, not alone but also through mediation mechanisms. Our analysis showed that the directional simple hypotheses (H1 and H2) as well as all the six mediation hypotheses (H3 to H8) were empirically supported. We observed that (1) the servant leadership dimensions' influence on job satisfaction and work motivation were larger than their effects on affective commitment, (2) the path from job satisfaction to affective commitment had the highest effect, (3) both servant leadership dimensions and affective commitment were equally good predictors of work motivation in terms of direct effects, and (4) a relationship between tenure and work motivation in our model occurred, which showed that the higher the level of academics' tenure, the lower their work motivation.

Overall, while our results are in line with the theoretical foundations and previous empirical findings on servant leadership and its dimensions' contribution to organizational outcomes in other contexts (e.g., Shareef and Atan (2019), Guchait et al. (2016), and Shim and Park (2019)), we moved one step further and focused on the effects of specific servant leadership dimensions that were consistent with leadership capabilities required for sustainability in higher education (Ghasemy, Elwood, & Scott, 2022c; Scott et al., 2012). In addition, in terms of the proposed relationships between the outcome variables, our findings are consistent with the findings in other studies, such as Ćulibrk et al. (2018) and Kim et al. (2016).

One relationship, that needs further evaluation, is the effect of tenure on academics' work motivation which, based on the affective events theory (AET) (Weiss & Beal, 2005), is an attitude. Surprisingly, the literature on this relationship is scarce. In addition, organizational and job tenure are not consistently related with other types of motivation, such as public service motivation (Ritz et al., 2016) and the results of studies on the effect of tenure on job satisfaction, as another important attitude, are mixed as well (Dobrow Riza et al., 2018). For example, Toode et al. (2015) in the context of healthcare systems found evidence for the positive relationship between nurses' duration of service (and age) with introjected regulation as one aspect of extrinsic work motivation. In contrast, and consistent with our findings, the study by Campos-García and Zúñiga-Vicente (2019) showed a negative relationship between leaders' long term in office and teachers' motivation in the context of Spanish secondary schools. Moreover, Zacher and Yang (2016) did not find evidence for the effect of organizational tenure on motivation to continue working.

Due to these related, but conflicting findings, we need to speculate about the reasons for the negative effect of tenure on academics' work motivation in our context. Wan et al. (2015) found in their study on the higher education sector that Malaysian academics were satisfied with their career choice in terms of teaching and research but were frustrated by the governmental structure in terms of governance, management, and administration. In concordance with the results of prior studies, such as the one conducted by Campos-García and Zúñiga-Vicente (2019), we can assume that age and tenure are related. Subsequently, those academics with higher tenure are old enough to have experienced the Malaysian

higher education sector in which the focus was more on teaching and research (satisfying conditions), instead of management and administration (frustrating conditions). Hence, we could find a rationale why with higher tenure the work motivation declined. This may be true because longer tenured leaders might be more prone to be entrenched in their positions, which might curtail their organizational effort and eventually lead to the dereliction of their duties (Campos-García & Zúñiga-Vicente, 2019).

4.2 Practical and policy implications

With respect to policy and practice, our findings offer several implications. Managing universities can be overwhelming, since these organization types are much bigger in size and, consequently, more complex, which calls for good leadership (Timiyo, 2016). Although neither of the servant leadership dimensions seem to be highly relevant in explaining affective commitment directly, practitioners can deduct policies in terms of the direct impact of behaving ethically and conceptual skills on academics' work motivation and job satisfaction, and an indirect impact on organizational commitment via job satisfaction. Importantly, our model clearly shows that the increase in job satisfaction subsequently and considerably improves academics' affective commitment. This is particularly important, since the growing dissonance, ambivalence, disconnect, and disengagement that contemporary academics feel toward their institutions (Bolden et al., 2014) are the factors that erode the psychological relationships between academics and their universities potentially and reduce their identification with and commitment to their institutions (Shrand & Ronnie, 2019).

To extend our results, we considered the IPMA (Ringle & Sarstedt, 2016), which supports identifying managerial areas of improvement. The results displayed in Fig. 3 and Table A8 (Online Appendix) show that the performance level of behaving ethically and the importance levels of behaving ethically and conceptual skills focusing on work motivation as the target construct are above average. Hence, the two leadership dimensions are most important in explaining work motivation as evidenced by their total effects (0.313 and 0.333, respectively), while behaving ethically performs best, due to its latent variable score (84.100). However, due to conceptual skills high importance, but relatively low performance, managers should especially pay attention to increasing this dimension's performance. Conceptual skills, as measured in this study, consist of three items, that are *thinking through complex problems*, *having an understanding of the organizations and its goals*, and *solving problems with new or creative ideas*. A great part lies on the emphasis of problem-solving skills. However, each person perceives a problem differently, while the problem might not necessarily be solvable and often requires new ideas (Garrett, 1987). Hence, universities should not only develop students' creative problem-solving skills, but also regularly train academics in further developing their knowledge of such ideas. One example could be *design thinking* as a technique to be learned and applied (Guaman-Quintanilla et al., 2022, in press).

A lecturer with a high level of motivation can indirectly influence teaching practice's quality through the engagement in professional learning activities (Thoonen et al., 2011). Academics certainly have an influence on their students' development, while those with science-related backgrounds, moreover, play an important role when it comes to achieving SDGs as well as advancing sustainable economies and societies. Given the observed negative significant relationship between tenure and work motivation in our study, policies should be made to enhance senior academics' motivation to avoid
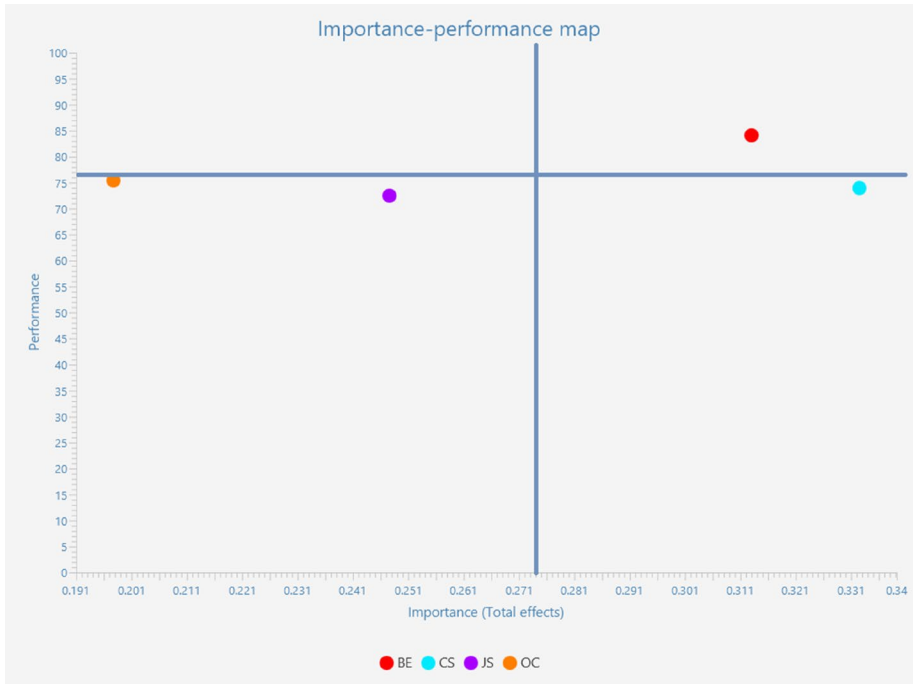
Fig. 3 IPMA results (Note: BE = Behaving ethically; CS = Conceptual skills; JS = Job satisfaction; OC = Organizational affective commitment)

unwanted outcomes or decreased performance and quality. As per Wan et al. (2015), Malaysian academics are especially satisfied by doing teaching and research.

Last, the extension of our main structural model evaluation results through multigroup analysis did not show any gender differences in terms of the relationships in our model. Therefore, universal policies, that are targeted to enhance academics' job satisfaction, affective commitment, and work motivation derived by servant leadership behaviors, can be formulated and implemented based on our final robust model irrespective of academics' gender.

5 Conclusion and further research

Servant leadership is relevant for higher education, since it ensures sustainable performance over time and encourages the idea of serving students, staff, and beyond. In this study, we examined behaving ethically and conceptual skills' impact on affective commitment, job satisfaction, and work motivation of academics with science-related backgrounds in the Malaysian higher education. We selected these two servant leadership dimensions due to their consistency with the interrelated interpersonal and intellectual capabilities required for sustainability in higher education (Scott et al., 2012). Both servant leadership dimensions and affective commitment were equally good predictors of work motivation. Given that the two servant leadership dimensions' magnitudes in their effects on affective

commitment were not highly relevant, we found that making use of servant leadership in increasing job satisfaction is an effective way to considerably improve academics' affective commitment to further increase their work motivation. With our study, we shed light on practicing servant leadership' importance in higher education institutions as a major drive for desirable organizational outcomes and provided evidence for the selected servant leadership dimensions' applicability when issues, such as sustainability in higher education and sustainable communities, societies, and economies, are matters of concern.

To conclude this study, we have a few limitations and future research directions to emphasize. First, in the interest of parsimony and considering the multidimensionality of the servant leadership scale (Liden et al., 2008), we only included two dimensions of servant leadership. Therefore, we recommend other researchers to investigate the influence of additional servant leadership dimensions on desirable as well as undesirable organizational outcomes. Second, researchers can focus on different groups of academics depending on their roles in achieving other SDGs (e.g., academics with medical and social sciences, such as public policy, backgrounds) or consider the effect of other covariates and demographic variables on the outcome variables in future research. Third, in our study in the higher education context, we found that work motivation decreased with tenure. Since evidence on this effect is scarce, or contradictory in social sciences research, this aspect should receive further research attention. Hence, researchers could compare academics with different tenure or tenured and non-tenured positions. Also, similar comparisons can be made on the grounds of academic staff and non-academic staff (e.g., admin and support staff) (Ferrero-Ferrero et al., 2018). Fourth, servant leadership can be more deeply examined in the context of higher education through qualitative research, since the number of qualitative studies on servant leadership seems to be inadequate (Eva et al., 2019). In terms of quantitative research, we recommend to use other methodological approaches, such as a necessary condition analysis (NCA) (Richter et al., 2020), parametric and efficient partial least square methodology (PLSe2) (Bentler & Huang, 2014; Ghasemy, 2022; Ghasemy et al., 2021a, 2024b; Ghasemy and Yuan, 2023) multilevel modeling (Yuan & Bentler, 2007), or longitudinal designs (Bentler, 2018; Newsom, 2016). Finally, since the results for Malaysian academics support our theory-based model of leadership in higher education, future research can build on our findings when conducting replication studies in other countries. Notably, due to the implementation of higher education harmonization policies in Southeast Asia (Morshidi et al., 2016; Yavaprabhas, 2014), we expect that our findings can be transferred to, for example, member states of the ASEAN countries.

Declarations

Conflict of interest No conflict of interest is declared by the authors with respect to the design and implementation of this research work.

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