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Motivation for International Academic Mobility: Comparing Incoming and Outgoing Engineering Students

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ABSTRACT

International academic mobility is a central dimension of higher education internationalization, yet limited attention has been given to the motivational processes that shape students' participation. Drawing on self-determination theory (SDT), this study examines the motivational profiles of outgoing and incoming engineering and architecture students at a large Spanish university using an adapted version of the Échelle de Motivation en Éducation (EME-E). The findings show that students generally display high levels of autonomous motivation, although important differences emerge across subgroups. Incoming students report greater amotivation, whereas outgoing students—particularly at the master's level—show stronger external and identified regulation. In addition, students who travel to Latin America exhibit greater intrinsic motivation and overall self-determination, whereas gender-related differences appear only among outgoing students. These results show that international mobility is not a homogeneous experience and highlight the importance of assessing motivational quality to inform more targeted and student-centered internationalization strategies.

Keywords: higher education internationalization; incoming students; international academic mobility; outgoing students; self-determination theory (SDT); student motivation; survey.

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INTRODUCTION

In an increasingly globalized higher education landscape, international student mobility has become a strategic priority for higher education institutions (HEIs). International academic experiences are widely associated with the development of global and intercultural competencies, employability, and personal growth and are therefore actively promoted through institutional internationalization strategies and mobility programs (Deardorff, 2006; Knight, 2012).

Despite this growing emphasis, internationalization efforts are still predominantly assessed through quantitative indicators such as participation rates, duration of mobility periods, or destination diversity (Salisbury et al., 2009; Cuzzocrea & Krzaklewska, 2023). While these indicators provide valuable information about engagement levels, they offer limited insight into the motivational processes underlying students' decisions to study abroad and the quality of their experiences. Understanding why students choose to engage in international study therefore remains a critical yet underexplored dimension of higher education internationalization.

Motivation plays a central role in students' academic decision-making, engagement, and persistence. Research in educational psychology has shown that not only the intensity but also the quality of motivation is crucial in explaining learning outcomes, well-being, and personal development (Ryan & Deci, 2020; Vansteenkiste et al., 2020). In international mobility contexts, students' motivational orientation is likely to influence both their decision to participate and their level of engagement, adaptability, and satisfaction during their stay abroad (Yue et al., 2022).

Self-determination theory (SDT) provides a robust framework for examining motivation in educational settings by distinguishing between autonomous and controlled forms of motivation and emphasizing the role of basic psychological need satisfaction (Ryan & Deci, 2020). Applying an SDT perspective to international student mobility enables a shift from descriptive accounts of students' motives to a more nuanced understanding of motivational quality. This distinction is particularly relevant, as autonomous motivation has been consistently associated with deeper engagement, better adjustment, and more meaningful learning experiences (Vansteenkiste et al., 2020; Yue et al., 2022).

Although previous studies have identified a wide range of motives for studying abroad—such as academic development, career advancement, language acquisition, and personal growth—these motives are often treated descriptively, without examining their degree of internalization (Salisbury et al., 2009; Cuzzocrea & Krzaklewska 2023). As a result, there is still limited empirical evidence on the quality and structure of students' motivation in international academic mobility contexts, particularly in engineering education.

In response to this gap, this study applies self-determination theory to analyze the motivational profiles of engineering students who participate in international academic mobility programs. By examining both outgoing and incoming students, this study aims to provide a comparative perspective on motivational orientation and to explore how factors such as gender, level of study, and geographical context are related to differences in motivational quality.

Beyond applying SDT to a new setting, this study contributes by showing that the motivational quality underlying international academic mobility is not homogeneous but varies according to students' position within the mobility process, their academic stage, and the destination context. By focusing on motivational quality, this research supports more targeted and effective mobility programs among HEIs.

LITERATURE REVIEW

Motivation and self-determination theory (SDT) in the context of education

A substantial body of research identifies motivation as a key determinant of students' academic engagement and performance (Pintrich & Schunk, 2002). Within this field, self-determination theory

(SDT) emphasizes that the quality of motivation—rather than its intensity—is central to understanding learning processes and outcomes (Ryan & Deci, 2000).

According to SDT, individuals base their motivation on the satisfaction of three basic psychological needs—autonomy, competence, and relatedness—which support their psychological well-being and optimal functioning. When individuals fulfill these needs, according to the SDT, motivation is grounded in the satisfaction of three basic psychological needs—autonomy, competence, and relatedness—which support psychological well-being and optimal functioning. When these needs are fulfilled, students are more likely to develop autonomous forms of motivation, leading to higher levels of engagement, persistence, and deeper learning (Deci & Ryan, 1985; Ryan & Deci, 2020).

Empirical research consistently shows that autonomous motivation is positively associated with academic achievement, well-being, and meaningful learning, whereas controlled forms of motivation are linked to less adaptive outcomes. Students driven by intrinsic motivation tend to achieve deeper understanding and greater conceptual assimilation (Benware & Deci, 1984; Grolnick & Ryan, 1987) but also report higher levels of satisfaction, engagement, and willingness to face challenges (Ryan & Connell, 1989; Pelletier & Vallerand, 1989). In contrast, controlled motivation is associated with higher levels of anxiety, poorer coping with failure, and less effective learning strategies.

More recent research reinforces these findings in higher education contexts, highlighting that autonomous motivation supports not only academic performance but also student well-being, persistence, and adaptability in complex learning environments (Ryan & Deci, 2020; Howard et al., 2021). Additionally, person-centered approaches suggest that different combinations of intrinsic and extrinsic regulations are associated with distinct academic and psychological outcomes, providing a more nuanced understanding of student motivation (Litalien et al., 2019).

Overall, the literature indicates that fostering self-determined motivation enhances learning, engagement, and student development.

Motivation measurement methods

Various instruments have been developed to assess student motivation in educational contexts, each capturing different aspects of this construct. Among the most widely used is the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, 1991), which evaluates motivational orientations alongside learning strategies through dimensions such as task value, self-efficacy, and test anxiety. Although comprehensive, its length and its combined focus on cognition and learning strategies make it less suitable for studies specifically centered on motivational regulation (Lynch, 2006; Matuga, 2009).

Other instruments approach motivation indirectly. For example, the Maslach Burnout Inventory–Student Survey (MBI-SS) assesses motivational depletion through dimensions such as exhaustion and cynicism (Maslach et al., 1997; Schaufeli et al., 2002), whereas measures such as the Academic Self-Concept Questionnaire capture students’ perceptions of their academic abilities rather than their underlying motivational processes (Reynolds, 1988; Choi, 2005). Although these tools provide valuable insights, they do not directly assess motivation along the self-determination continuum proposed by SDT.

Instruments more closely aligned with SDT include the Intrinsic vs. Extrinsic Orientation Scale (Harter, 1981) and the Academic Intrinsic Motivation Inventory (Gottfried, 1985). However, these scales present limitations, as they either treat intrinsic and extrinsic motivation as opposite ends of a single continuum or focus exclusively on intrinsic motivation, without capturing the differentiated forms of extrinsic regulation or amotivation. In addition, many of these instruments were developed for primary or secondary education contexts, limiting their applicability in higher education.

Given these limitations, the present study focuses on analyzing motivational orientation—that is, the degree to which students’ motivation is intrinsic, extrinsic, or amotivated—within the framework of self-determination theory. This requires an instrument capable of distinguishing between multiple forms of motivational regulation while remaining applicable to higher education contexts.

Échelle de Motivation en Éducation (EME)

The EME (Vallerand et al., 1989) is a measurement instrument explicitly grounded in self-determination theory and designed for postsecondary education contexts. It enables the assessment of both the type and degree of motivation underlying students' academic engagement.

The EME consists of 28 items rated on a seven-point Likert scale, with responses to the question "Why do you attend university?". The instrument is structured into seven subscales, representing three forms of intrinsic motivation (knowledge, achievement, and stimulation), three forms of extrinsic motivation (identified, introjected, and external regulation), and amotivation. This structure allows for a differentiated analysis of motivational regulation along the self-determination continuum.

The instrument has demonstrated strong psychometric properties in previous research, including high internal consistency across subscales and evidence of construct validity through confirmatory factor analyses (Vallerand et al., 1989). Its multidimensional structure and theoretical alignment with SDT make it particularly suitable for examining motivational profiles in higher education settings.

In the present study, EME is used to assess students' motivational orientation in international academic mobility.

Self-Determination Index (SDI)

In addition to analyzing individual motivational dimensions, this study employs the self-determination index (SDI) as a global indicator of motivational orientation. The SDI is a composite measure that represents the degree to which an individual's motivation is self-determined, positioning motivation along a continuum from controlled regulation and amotivation to autonomous motivation (Vallerand, 1997; Ryan & Deci, 2020).

The index is calculated by combining the EME subscales using a weighting scheme that assigns positive values to autonomous forms of motivation (intrinsic motivation and identified regulation) and negative values to controlled forms and amotivation (1). Higher SDI scores therefore indicate a more autonomous motivational profile, whereas lower scores reflect a more controlled or amotivated orientation.

$$SDI = 2 \cdot ((MIC + MIEE + MIL)) / 3 + MEID - ((MEIN + MERE)) / 2 + 2 \cdot D \quad (1)$$

The use of the SDI provides a synthetic and interpretable measure of motivational quality, complementing the analysis of individual subscales. It facilitates comparisons across groups and contexts and has been widely applied in educational research to examine the relationships among motivation, engagement, and well-being (Vallerand, 1997; Vansteenkiste et al., 2020).

Students' motivation to study abroad

Research on international student mobility has increasingly shifted from structural explanations toward a focus on individual motivational processes. Early studies emphasized contextual determinants such as institutional reputation, financial factors, language, and employability (Li & Bray, 2007; Salisbury et al., 2009), whereas more recent work highlights the role of motivation in explaining participation in international study and shaping students' academic and social experiences abroad (Glass et al., 2015) or other noneconomic aspects of motivation (Tokas et al. 2023).

Prior research identifies motives for studying abroad, including academic development, career advancement, language acquisition, cultural exploration, and personal growth (Salisbury et al., 2009; Cuzzocrea & Krzaklewska, 2023; Glass et al., 2015). However, these motives are often presented descriptively, without sufficient attention given to the degree to which they are internalized by students. As a result, students who share similar reasons for mobility may nevertheless differ substantially in the quality of their motivation and in the meanings they attach to the experience.

Moreover, contemporary research on international students has shown that mobility experiences are shaped by identity negotiation, belonging, and intercultural development. These perspectives suggest that international mobility is not only a decision-making process but also a relational and developmental experience in which students interpret and rework their place within new academic, social, and cultural environments (Glass et al., 2015; Cena et al., 2021; Tavares, 2021; Deardorff, 2006). From this perspective, students' engagement in mobility cannot be fully understood only in terms of participation decisions or external conditions but must also be examined in relation to how they experience connection, recognition, and personal growth in international settings.

Self-determination theory provides a valuable framework for examining motivation to study abroad because it distinguishes between autonomous and controlled regulation and allows a closer analysis of how students internalize the value of mobility. Moreover, SDT does not directly capture all the relational, cultural, and identity-related dimensions emphasized in contemporary international student research. Its strength lies in clarifying the quality of motivation underlying mobility participation and in helping explain why apparently similar motives may be associated with different forms of engagement.

Despite advances in this area, much of the international mobility literature continues to rely on descriptive approaches or push-pull models, with limited use of validated SDT-based instruments. This gap highlights the need for empirical research examining the quality of motivation underlying international academic mobility, particularly in higher education and engineering contexts.

RESEARCH METHOD

The primary objective of this study is to examine the motivational orientation of engineering students who participate in international academic mobility programs at UPM, drawing on SDT. The analysis includes both outgoing students (home students studying abroad) and incoming students (international students studying at the host institution), with the aim of identifying the dominant types of motivation underlying participation in international mobility.

A second objective is to compare motivational profiles between outgoing and incoming students to assess whether different roles within international mobility contexts are associated with distinct patterns of intrinsic motivation, extrinsic motivation, or amotivation. An additional objective is to explore potential gender differences in motivational orientation among engineering students engaged in international academic experiences, contributing to ongoing discussions on diversity and inclusion in internationalization within engineering education.

On the basis of these objectives, the study addresses the following research questions:

RQ1. What types of motivation, as defined by SDT, characterize engineering students' participation in international academic mobility programs?

RQ2. Are there significant differences in motivational profiles between outgoing and incoming engineering students?

RQ3. Does gender influence the motivational orientation of engineering students engaged in international mobility experiences?

RQ4. Are there significant differences in motivational profiles across different engineering schools or geographical regions, and how do these contextual factors shape students' motivational orientation toward international academic mobility?

By focusing on motivational quality rather than participation alone, this research aims to inform more targeted and effective internationalization strategies within HEIs.

Methodology

SDT was adopted as the theoretical framework of the study, together with its associated measurement instrument, the EME-E, to address the research objectives. For the purposes of this research, the EME-E was contextually adapted to the international academic mobility setting by explicitly referring to students' participation in an international study experience in all questionnaire items. This adaptation was applied consistently across all the items and subscales while preserving the original wording, structure, response scale, and theoretical meaning of the instrument. No items were added or removed, ensuring that the EME-E continued to measure the same motivational constructs—*intrinsic motivation*, *extrinsic motivation*, and *amotivation*—while increasing its ecological validity for international mobility contexts. The questionnaire was administered in English to incoming students and in Spanish to outgoing students, reflecting the primary language of instruction and communication for each group. Both versions were equivalent in content and structure, ensuring consistency across language versions while facilitating comprehension and response accuracy among participants. Spanish and English versions were validated previously (Vallerand et al. 1989; Nuñez Alonso et al. 2005).

The research methodology comprised three main stages. First, students' academic motivation was measured using the adapted EME-E among engineering students who participated in international mobility programs at UPM, including both outgoing and incoming students. Second, the collected data were analyzed using the Statistix software program to examine patterns and differences in motivational orientation in line with the study objectives. Third, the results were interpreted within the SDT framework, allowing conclusions to be drawn regarding students' motivation in international academic contexts and the implications for internationalization strategies in HEIs.

Participation was voluntary and anonymous, and no sensitive personal data were collected. Under institutional procedures for low-risk educational research, formal ethics committee approval was not needed.

Study variables

In this study, data on the demographic characteristics and motivational profile variables of each participant were collected. These variables were used to examine differences in motivational orientation across student characteristics and mobility contexts within engineering education.

The demographic variables included sex (male/female), academic school, level of study (undergraduate or master's), type of mobility, and host country. Types of mobility were grouped into four standardized categories to ensure consistency across programs: (1) one-semester exchange, (2) one-year exchange, (3) double degree mobility, and (4) internship mobility. This classification aligns with institutional terminology and avoids references to program-specific labels that may not be widely recognized internationally.

Motivational profile variables were derived from the adapted EME-E and included demotivation (amotivation) (D), extrinsic motivation through external regulation (MERE), introjected regulation (MEIN), and identified regulation (MEID), as well as intrinsic motivation for knowledge (MIC), achievement (MIL), and stimulating experiences (MIEE).

For each motivational dimension, scores were calculated as the means of the four items corresponding to that subscale, in accordance with the original structure of the EME-E.

Research design

The study adopts a cross-sectional design, with data collected at a single point in time during October 2025. This design choice is supported by prior research demonstrating the high temporal stability of the EME-E. Previous validation studies report stability coefficients averaging 0.75 over a one-month period, indicating that motivational orientations measured with the EME-E remain relatively stable in the short

term. This finding supports the use of cross-sectional data to reliably assess students' motivational profiles.

Compared with longitudinal designs, the cross-sectional approach allows for more efficient data collection while providing a clear snapshot of student motivation across different groups. This design is particularly suited to the objectives of the present study, as it facilitates the identification of similarities and differences in motivational orientation according to mobility status and student characteristics, without requiring extended follow-up periods. The overall research process followed a four-stage workflow, consisting of (1) the contextual adaptation of the EME-E instrument, (2) its distribution through the University's International Office, (3) the collection of student responses, and (4) the statistical analysis of the resulting data.

Data collection procedure

Microsoft Forms was selected for its accessibility, multilingual compatibility, and integration within the university's secure Microsoft 365 environment. The survey included 28 items from the adapted EME-E and five demographic questions and was distributed through the University's International Office to students participating in international mobility programs.

A total of 442 students responded to the survey, including 358 outgoing and 84 incoming students. Participation was voluntary and anonymous, a feature that supported honesty and protected participants' privacy. No time limit was imposed for completing the questionnaire, allowing respondents to answer at their own pace and reducing potential response bias associated with time pressure.

Statistical analysis

Statistical analyses were conducted using GraphPad Prism 10.2.0 software (GraphPad Software, San Diego, California, USA). The Shapiro–Wilk test was employed to assess data normality, and the Bartlett test was used to evaluate variance homogeneity. Both tests were performed on residuals, with a p value greater than 0.05 indicating that the null hypothesis could not be rejected. All the variables met the criteria for normality and homoscedasticity ($p > 0.05$ in all the cases); thus, no transformations or nonparametric alternatives were needed. Two-way analysis of variance (ANOVA) was performed for each variable, with outgoing/incoming, sex, level of study, school of origin/destination, and geographic region as fixed factors. Post hoc mean comparisons were conducted using the Tukey test, with statistical significance set at $p < 0.05$.

RESULTS

Sample characteristics

The final sample consisted of 442 engineering students who participated in international academic mobility programs. Of these, 358 were outgoing students, including 166 women and 188 men (4 preferred not to specify their gender), 269 were undergraduate students and 89 were master's students. The incoming student group comprised 84 participants, including 35 women and 49 men, of whom 47 were undergraduate students and 37 were master's students.

General Motivational Profile: Outgoing vs. Incoming Students

A comparative analysis of outgoing and incoming students revealed that both groups displayed high levels of autonomous motivation, particularly in the intrinsic motivation subscales and in identified regulation (Table 1). Across groups, the highest mean scores were observed for intrinsic motivation for knowledge (MIC) and identified regulation (MEID), indicating that international mobility was generally associated with personally valued and self-determined reasons.

Only two significant differences emerged. Incoming students reported higher amotivation (D), whereas outgoing students showed higher external regulation (MERE). No significant differences were found for introjected regulation, the intrinsic motivation subscale, or the self-determination index (SDI). Overall, these results suggest that although both groups were characterized by broadly self-determined motivational profiles, incoming students experienced slightly more uncertainty, whereas outgoing students appeared to be more influenced by external or instrumental considerations.

Table 1. Descriptive statistics (mean $\pm$ SD) and group comparisons of motivational dimensions between outgoing and incoming engineering students in international mobility programs.

Parameter	Outgoing	Incoming	Pvalue
N	358	84	
D	1.88 $\pm$ 0.97a	2.13 $\pm$ 0.93b	0.0385*
MERE	4.68 $\pm$ 1.31a	4.29 $\pm$ 1.36b	0.0163*
MEIN	4.60 $\pm$ 1.28	4.76 $\pm$ 1.32	0.3232
MEID	5.54 $\pm$ 1.03	5.43 $\pm$ 1.00	0.4008
MIC	6.10 $\pm$ 0.73	6.05 $\pm$ 0.67	0.5335
MIL	5.42 $\pm$ 0.95	5.31 $\pm$ 1.00	0.3369
MIEE	4.49 $\pm$ 1.22	4.54 $\pm$ 1.05	0.7753
SDI	7.81 $\pm$ 3.02	7.26 $\pm$ 2.79	0.1236

a, b, c Different letters indicate significant differences between groups ($p < 0.05$).

Motivation by gender

Gender-based comparisons revealed limited differences in motivational orientation (Figure 1). Among outgoing students, women reported significantly higher levels of introjected regulation (MEIN) and intrinsic motivation for stimulating experiences (MIEE) than men did. No significant sex differences were found for the remaining dimensions, including the SDI, indicating that female and male outgoing students shared a similarly self-determined overall profile.

Among incoming students, no statistically significant sex differences were observed in any motivational dimension. Thus, gender-related variation appeared only in the outgoing group and was restricted to specific dimensions rather than to overall motivational quality.

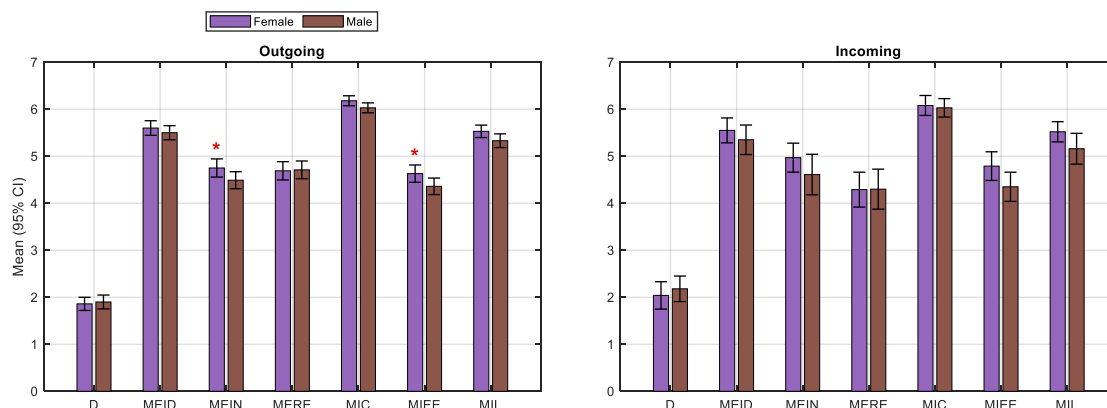


Figure 1. Gender comparisons

Motivation by Level of Study

Differences by level of study were more evident among outgoing students than among incoming students (Table 32). Within the outgoing group, compared with undergraduate students, master's students scored significantly higher on external regulation (MERE) and identified regulation (MEID), suggesting a more instrumental and goal-oriented motivational pattern. However, no differences were found in the intrinsic motivation subscales or in the SDI, indicating that this stronger instrumental orientation coexisted with important levels of autonomous motivation.

Within the incoming group, the only significant difference concerned amotivation (D), which was greater among undergraduate students than among master's students. No other motivational dimensions varied significantly by study level. These results suggest that academic stage plays a more prominent role in shaping the motivation of outgoing students, whereas for incoming students, the main distinction lies in the greater uncertainty or lack of direction reported by undergraduates.

Table 2 *Comparison of types of motivation based on study level (undergraduate or Master's student) for outgoing and incoming students*

Parameter	Outgoing students			Incoming students		
	UNDERGRADUATE	MASTER	PVALUE	UNDERGRADUATE	MASTER	PVALUE
N	269	89		47	37	
D	1.91 ± 0.96	1.81 ± 0.99	0.3918	2.31 ± 0.96	1.88 ± 0.85	0.0302*
MERE	4.53 ± 1.29 ^a	5.15 ± 1.26 ^B	0.0001*	4.45 ± 1.45	4.10 ± 1.23	0.2500
MEIN	4.62 ± 1.28	4.56 ± 1.29	0.6795	4.90 ± 1.30	4.59 ± 1.35	0.2962
MEID	5.44 ± 1.05 ^A	5.83 ± 0.91 ^B	0.0022*	5.48 ± 1.11	5.38 ± 0.83	0.6493
MIC	6.11 ± 0.71	6.08 ± 0.79	0.6658	6.10 ± 0.62	5.98 ± 0.73	0.3936
MIL	5.39 ± 0.96	5.52 ± 0.93	0.2922	5.34 ± 1.10	5.28 ± 0.88	0.7751
MIEE	4.53 ± 1.20	4.39 ± 1.28	0.3688	4.59 ± 1.08	4.47 ± 1.03	0.5940
SDI	7.74 ± 3.06	8.02 ± 2.88	0.4542	6.86 ± 2.92	7.76 ± 2.58	0.1454

a, b, c Different letters indicate significant differences between groups ($p < 0.05$)

Motivation by School of Origin or Destination

Motivational profiles were also examined by academic school, separately for outgoing and incoming students, given that schools represent different meanings in each group: institutional origin for outgoing students and destination context for incoming students. Among outgoing students, motivational profiles were largely homogeneous across schools, with significant variation observed only in intrinsic motivation for stimulating experiences (MIEE). Among incoming students, greater variability emerged, with significant differences in amotivation (D), MIEE, and SDI. These results suggest that the role of the academic field is more differentiated for incoming students than for outgoing students. However, given the small subsample sizes in some schools, these findings should be interpreted with caution. Detailed school-level descriptive statistics are available in the supplementary material.

Motivation by Region

Regional analyses also revealed different patterns for outgoing and incoming students (Figure 12). Among outgoing students, significant differences were observed in external regulation (MERE),

identified regulation (MEID), intrinsic motivation for knowledge (MIC), intrinsic motivation for stimulating experiences (MIEE), and SDI. The most self-determined pattern was found among students traveling to Latin America, who reported higher levels of identified and intrinsic motivation as well as higher SDI scores. In contrast, students traveling to North America reported the highest levels of external regulation, suggesting a comparatively stronger instrumental orientation.

Among incoming students, no significant differences were found by region of origin in any motivational dimension. This finding indicates a broadly homogeneous motivational profile across geographical backgrounds, in contrast to the more differentiated regional patterns observed among outgoing students.

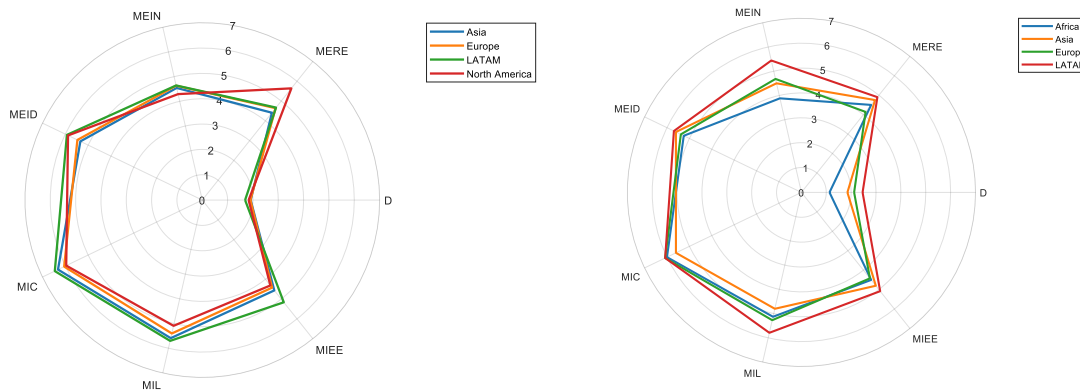


Figure 2. Outgoing (left) and incoming (right): motivational profile by region

DISCUSSION

The findings of this study are broadly consistent with research grounded in self-determination theory (SDT), which emphasizes the predominance of autonomous motivation in educational contexts involving choice, challenge, and self-development (Ryan & Deci, 2020; Vansteenkiste et al., 2020). The high levels of intrinsic motivation and identified regulation observed among both outgoing and incoming engineering students suggest that participation in international academic mobility is largely driven by self-determined motives rather than by controlled regulation alone, in line with previous research on student mobility and international learning experiences (Yue et al., 2022; Cuzzocrea & Krzaklewska, 2023).

Moreover, the results indicate that international mobility is not experienced homogeneously. Incoming students reported greater amotivation than outgoing students did, particularly at the undergraduate level, which may reflect the academic and cultural adjustment challenges commonly associated with the transition to a host institution (Salisbury et al., 2009; Yue et al., 2022; Telbis et al., 2014). From an SDT perspective, this pattern may reflect lower initial satisfaction of autonomy, competence, and relatedness needs within the host institution. Unfamiliar academic expectations, weaker initial belonging, and the challenge of navigating a new institutional culture may reduce students' sense of direction and agency, particularly during the initial stages of adjustment. In contrast, outgoing students—especially those at the master's level—showed higher levels of external and identified regulation, suggesting a more instrumental orientation linked to professional goals, employability, and career planning, a pattern also noted in previous studies on mobility decision-making (Cuzzocrea &

Krzaklewska, 2023). The coexistence of higher identified and external regulation suggests that mobility at this stage may be experienced simultaneously as personally valuable and strategically useful.

Gender differences were limited and appeared only among outgoing students. Women reported greater introjected regulation and intrinsic motivation for stimulating experiences, indicating stronger affective engagement and a greater sense of internalized commitment to the mobility experience. These results are consistent with the broader literature showing that gender differences in motivation tend to be modest and context-dependent in higher education (Howard et al., 2021). The absence of gender differences among incoming students may indicate that the demands of international adjustment override smaller gender-based distinctions in motivational orientation.

Differences by level of study further highlight the importance of academic stage. Among outgoing students, master's participants displayed greater identified and external regulation, suggesting that mobility at later stages of study may be more clearly connected to professional and strategic goals. In contrast, higher amotivation among undergraduate incoming students points to greater vulnerability or uncertainty in earlier stages of academic development, which is in line with prior work on international transitions in higher education (Li & Bray, 2007; Litalien et al., 2019).

From an SDT perspective, the more self-determined profile observed among students traveling to Latin America may reflect stronger expectations of relatedness, familiarity, and meaningful social connection, possibly linked to perceived linguistic or cultural proximity (Ryan & Deci, 2020). These destinations may be experienced not only as academically valuable but also as personally accessible and relationally rich, which could facilitate the internalization of mobility as a meaningful educational experience. In contrast, the relatively higher external regulation associated with North American destinations may reflect the symbolic value of these destinations in terms of prestige, employability, and academic distinction. This interpretation is also consistent with recent research suggesting that students' mobility preferences are shaped not only by individual motivations but also by broader sociogeographic imaginaries and by the social meanings attached to particular destinations (Ang et al., 2026). The absence of regional differences among incoming students suggests that, for this group, motivation may be shaped less by geographical origin than by the broader decision to engage in mobility.

The present findings also highlight both the value and the limits of SDT in the analysis of international academic mobility. SDT is particularly useful for distinguishing the quality of students' motivation and for moving beyond descriptive lists of reasons for mobility. However, international academic mobility is also shaped by relational, cultural, identity-related, and sociogeographic processes that fall only partially within the scope of SDT. In this sense, the framework helps explain how students internalize the value of mobility, but it does not fully capture broader dynamics of identity negotiation, belonging, intercultural development, or the symbolic imaginaries associated with specific destinations that are central to international student experience (Ang et al., 2026). Future research may therefore benefit from combining SDT with perspectives on belonging, identity development, intercultural learning, and sociogeographic imaginaries to provide a more comprehensive account of students' mobility experiences.

Taken together, these findings reinforce the importance of moving beyond participation metrics in the study of internationalization. They show that students may participate in mobility for different reasons and that the quality of motivation varies according to their direction of mobility, academic stage, gender, and destination context.

For HEIs, this has practical implications: incoming undergraduate students may benefit from targeted support aimed at reducing uncertainty and strengthening belonging, competence, and institutional orientation, whereas outgoing students—especially at the master's level—may benefit from mobility programmes framed not only in terms of career value but also in terms of personal and academic development. More broadly, understanding motivational profiles can support the design of more targeted and student-centered internationalization strategies, including destination-sensitive communication and support mechanisms for groups with higher levels of controlled motivation or amotivation.

CONCLUSIONS

This study examined the motivational quality underlying academic mobility among students at UPM from an SDT perspective, with particular attention given to differences in mobility direction, gender, level of study, school, and region.

With respect to RQ1, the results show that both outgoing and incoming students generally display high levels of autonomous motivation, particularly intrinsic motivation and identified regulation. These findings suggest that participation in international academic experiences is largely driven by self-determined motives linked to learning, personal development, and the perceived value of mobility.

In response to RQ2, the findings indicate that motivational profiles are not homogeneous across student groups. Incoming students report greater amotivation, whereas outgoing students—especially at the master's level—show greater external and identified regulation. In addition, outgoing students traveling to Latin America present the most self-determined profiles, while those choosing North America display relatively higher external regulation. These results suggest that motivational quality is shaped not only by the decision to participate in mobility but also by academic stage and destination context.

For RQ3, gender differences are limited and context dependent. Significant differences appear only among outgoing students, with women reporting higher levels of introjected regulation and stimulation-related intrinsic motivation. No gender differences are observed among incoming students, indicating that gender does not operate as a general determinant of motivational orientation in international mobility contexts.

In terms of RQ4, the study also reveals that motivational profiles vary across academic schools and geographical regions, although these patterns differ between outgoing and incoming students. Among outgoing students, differences across schools are limited to stimulation-related intrinsic motivation, whereas incoming students show greater heterogeneity in terms of amotivation, stimulation, and overall self-determination. Regional differences are evident only among outgoing students, reinforcing the role of contextual factors in shaping motivation.

Overall, the findings confirm that international academic mobility is not a homogeneous experience and that participation rates alone are insufficient to understand students' engagement in mobility programs. Assessing motivational quality adds a critical layer to understanding international academic mobility and offers institutions a powerful tool for designing more meaningful, inclusive, and motivation-supportive mobility pathways. For HEIs, this approach can support more targeted, student-centered internationalization strategies and contributes empirical evidence for moving beyond structural indicators toward a deeper understanding of how students experience and value international mobility.

More broadly, the results of this study suggest that international mobility should be understood not only as a question of participation but also as a differentiated motivational experience in which students assign distinct meanings and values to studying abroad.

LIMITATIONS AND FUTURE RESEARCH

Despite its contributions, this study has several limitations. First, the data were collected within a single institutional context, which may limit the generalizability of the findings to other higher education systems or cultural settings. Second, the cross-sectional design does not allow for an examination of how students' motivation evolves over time or across different stages of the mobility experience. Third, although the overall sample size is robust, some academic schools are represented by very small subsamples, which limits the reliability of comparisons across fields of study. This limitation is particularly relevant for school-level analyses, which should be interpreted as exploratory.

Future research could address these limitations by adopting longitudinal designs, expanding the analysis to multiple institutions and countries, and combining quantitative measures with qualitative or mixed-method approaches. Such work would make it possible to examine motivational change over time,

explore the contextual factors shaping students' decisions and experiences, and assess whether the patterns identified here are institution-specific or reflect broader trends in international engineering education. Further research could also investigate how motivational profiles are related to academic, intercultural, and well-being outcomes, thereby enhancing the understanding of how international mobility programs can better support autonomous motivation and maximize its educational impact.

IMPLICATIONS

The findings of this study have practical implications for the design and management of international mobility programs in higher education institutions. First, the results suggest that mobility support should not be conceived as a uniform intervention. Incoming undergraduate students, who showed comparatively higher levels of amotivation, may benefit from stronger institutional support during the initial stages of their stay, particularly initiatives aimed at reducing uncertainty and strengthening competence, belonging, and familiarity with the host academic environment. Orientation activities, mentoring, peer support, and early academic guidance may therefore play important roles in facilitating adjustment and helping students develop a stronger sense of agency and purpose.

For outgoing students, particularly at the master's level, the coexistence of higher identified and external regulation suggests that international mobility is often perceived both as personally meaningful and as strategically valuable for future professional development. HEIs may therefore benefit from presenting mobility opportunities not only in terms of employability, prestige, or career advantages but also in terms of learning, personal development, intercultural growth, and meaningful engagement. Such framing may help students internalize the value of mobility more fully and strengthen autonomous forms of motivation.

Finally, the regional differences observed among outgoing students suggest that destinations may carry distinct motivational meanings. Perceived cultural proximity, social connection, prestige, or professional opportunity may influence how students value different mobility experiences. Internationalization strategies could therefore incorporate more destination-sensitive communication and preparation, rather than promoting mobility opportunities as if they were motivationally equivalent. More broadly, assessing motivational quality can complement traditional mobility indicators and provide HEIs with a more student-centered basis for designing, communicating, and supporting international academic experiences.

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REFERENCES

- Ang, M. W., Yang, P., & Toh, Y. Y. (2026). The grass is greener further away, right? Sociogeographic imaginaries and psycho-social motivations of short-term student mobilities. *Journal of International Students*, 91-110. <https://doi.org/10.32674/ck6f2x62>
- Benware, C. A., & Deci, E. L. (1984). Quality of learning with an active versus passive motivational set. *American Educational Research Journal*, 21(4), 755–765. <https://doi.org/10.2307/1162999>
- Cena, E., Burns, S., & Wilson, P. (2021). Sense of belonging, intercultural and academic experiences among international students at a University in Northern Ireland. *Journal of International Students*, 11(4), 812-831. <https://doi.org/10.32674/jis.v11i4.2541>
- Choi, N. (2005). Self-Efficacy and Self-Concept as Predictors of College Students' *Academic Performance*. *Psychology in the Schools*, 42(2), 197–205. <https://doi.org/10.1002/pits.20048>
- Cuzzocrea V, Krzaklewska E. (2023). Erasmus students' motivations in motion: understanding supermobility in higher education. *High Educ* (Dordr).;85(3):571-585. <https://doi.org/10.1007/s10734-022-00852-6>.
- Deardorff, D. K. (2006). Identification and assessment of intercultural competence as a student outcome of internationalization. *Journal of Studies in International Education*, 10(3), 241–266. <https://doi.org/10.1177/1028315306287002>
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York, NY: Plenum. <https://doi.org/10.1007/978-1-4899-2271-7>
- Glass, C. R., Kociolek, E., Wongtrirat, R., Lynch, R. J., & Cong, S. (2015). Uneven experiences: The impact of student–faculty interactions on international students’ sense of belonging. *Journal of Studies in International Education*, 19(4), 353–367. <https://doi.org/10.32674/jis.v5i4.400>
- Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology*, 77(6), 631–645. <https://doi.org/10.1037/0022-0663.77.6.631>
- Grolnick, W. S., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual difference investigation. *Journal of Personality and Social Psychology*, 52(5), 890–898. <https://doi.org/10.1037/0022-3514.52.5.890>
- Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informational components. *Developmental Psychology*, 17(3), 300–312. <https://doi.org/10.1037/0012-1649.17.3.300>

- 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>
- Knight, J. (2012). Concepts, Rationales, and Interpretive Frameworks in the Internationalization of Higher Education. In *The SAGE Handbook of International Higher Education* (pp. 27-42). Sage. <https://doi.org/10.4135/9781452218397.n2>
- Li, M., & Bray, M. (2007). Cross-border flows of students for higher education: Push-pull factors and motivations of mainland Chinese students in Hong Kong and Macau. *Higher Education*, 53(6), 791-818. <https://doi.org/10.1007/s10734-005-5423-3>
- Litalien D., Gillet N., Gagné M., Ratelle, C. F.; Morin A. J. S., (2019) Self-determined motivation profiles among undergraduate students: A robust test of profile similarity as a function of gender and age, *Learning and Individual Differences*, Vol 70 Pg 39-52, <https://doi.org/10.1016/j.lindif.2019.01.005>.
- Lynch, D. J. (2006). Motivational factors, learning strategies and resource management as predictors of course grades. *College Student Journal*, 40(2), 423-428.
- Maslach, C., Jackson, S. E., & Leiter, M. P. (1997). Maslach Burnout Inventory: Third edition. In C. P. Zalaquett & R. J. Wood (Eds.), *Evaluating stress: A book of resources* (pp. 191-218). Scarecrow Education.
- Matuga, J.M. (2009). Self-Regulation, Goal Orientation, and Academic Achievement of Secondary Students in Online University Courses. *J. Educ. Technol. Soc.*, 12, 4-11. <http://www.jstor.org/stable/jeductechsoci.12.3.4>
- Núñez Alonso, J.L.; Martín-Albo Lucas, J.; Navarro Izquierdo, J. G. (2005) Validación de la versión española de la Échelle de Motivation en Éducation *Psicothema*, vol. 17, núm. 2, pp. 344-349 Universidad de Oviedo Oviedo, España
- Pelletier, L.G. & Vallerand, R.J. (1989) «Behavioral confirmation in social interaction: Effects of teachers expectancies on students' intrinsic motivation» *Canadian Psychology*.
- Pintrich, P.R. (1991). *A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)*.
- Pintrich, P. R., & Schunk, D. (2002). *Motivation in education: Theory, research, and applications* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.
- Reynolds, W.M. (1988). Measurement of Academic Self-Concept in College Students. *Journal of Personality Assessment*, 52, 223-240. https://doi.org/10.1207/s15327752jpa5202_4
- Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: examining reasons for acting in two domains. *Journal of personality and social psychology*, 57(5), 749-761. <https://doi.org/10.1037/0022-3514.57.5.749>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The 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>.
- Salisbury, M. H., Umbach, P. D., Paulsen, M. B., & Pascarella, E. T. (2009). Going global: Understanding the choice process of the intent to study abroad. *Research in Higher Education*, 50(2), 119-143. <https://doi.org/10.1007/s11162-008-9111-x>
- Schaufeli, W. B.; Martínez, I. M.; Marques Pinto, A.; Salanova, M.; & Bakker, A. B. (2002). Burnout and engagement in university students: A cross-national study. *Journal of Cross-Cultural Psychology*, 33(5), 464-481. <https://doi.org/10.1177/0022022102033005003>.

- Tokas, S., Sharma, A., Mishra, R., & Yadav, R. (2023). Non-Economic Motivations behind International Student Mobility: An Interdisciplinary Perspective. *Journal of International Students*, 13(2), 155-171 <https://doi.org/10.32674/jis.v13i2.4577>.
- Tavares, V. (2021). Theoretical Perspectives on International Student Identity. *Journal of Comparative & International Higher Education*, 13(2), 83–97. <https://doi.org/10.32674/jcihe.v13i2.2949>
- Telbis, N. M., Helgeson, L., & Kingsbury, C. (2014). International students' confidence and academic success. *Journal of International Students*, 4(4), 330–341. <https://doi.org/10.32674/jis.v4i4.452>
- Vallerand, R. J.; Blais, M. R.; Brière, N. M.; & Pelletier, L. G. (1989). Construction et validation de l'échelle de motivation en éducation (EME) [Construction and validation of the Motivation toward Education Scale]. *Canadian Journal of Behavioral Science/Revue canadienne des sciences du comportement*, 21(3), 323–349. <https://doi.org/10.1037/h0079855>.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology*, 29, 271–360. [https://doi.org/10.1016/S0065-2601\(08\)60019-2](https://doi.org/10.1016/S0065-2601(08)60019-2)
- Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion*, 44(1), 1–31. <https://doi.org/10.1007/s11031-019-09818-1>
- Yue, Y., Lu, J., & Lu, X. (2022). International students' motivation to study abroad: An empirical study based on expectancy-value theory and self-determination theory. *Frontiers in Psychology*, 13, 841122. <https://doi.org/10.3389/fpsyg.2022.841122>

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