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Motivation Profiles, Personal Values, and Personality Traits: The Interplay in Research Management and Administration

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Abstract

This study addresses a significant gap in the literature by examining the motivation profiles of Research Managers and Administrators (RMAs) and their correlation with personal values and personality traits. Drawing on Self-Determination Theory (SDT), the research sought to propose and validate a conceptual framework specifically for RMAs, introducing the distinct profile of outcome-driven motivation. Empirical data were collected using a quantitative, cross-sectional survey (N=1,095 valid responses) distributed via snowball sampling. The methodological rigor was demonstrated through Exploratory Factor Analysis (EFA), with highly suitable data (KMO=0.915, $p<0.001$) and high reliability (Cronbach's alpha ranging from 0.757 to 0.880). The EFA validated the construct of three distinct motivation profiles. RMAs were found to exhibit a predominantly autonomous (intrinsic) drive, confirmed by the highest mean score among the profiles, with statistically significant differences between all three types of motivation. This intrinsic motivation aligns with personal values that emphasize benevolence and universalism while downplaying power and tradition, and personality traits showing high conscientiousness, openness, and agreeableness. This work extends the use of SDT in Science and Technology Studies by validating a specific measurement scale for RMA motivation profiles. The results offer practical guidance, supporting the need for flexible, tailored motivational strategies and policies that enhance intrinsic factors such as autonomy and competency to boost RMA performance.

Keywords:

Research Management and Administration;
Motivation Profiles;
Personal Values;
Personality Traits;
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1- Introduction

Research has played a seminal role in the advancement of society since the Industrial Revolution. Nevertheless, the globalization of research within the industry sector became a well-defined trend only by the mid-1980s [1]. This tendency has evolved rapidly, and since the 1990s, the industry sector has increasingly adopted collaborative research projects with academia searching for access to specialized knowledge and capabilities [2]. Concomitantly, the introduction of the 'new public management' paradigm in higher education since the 1980s [3] brought about a greater need for accountability of public money invested in science and technology and for the delivery of added value to society in general. This led to what Fowler et al. [4] call the 'projectification' of research activities. In turn, this led to the emergence of a new professional space within academia and science-related organizations, specifically focused on the management and administration of research activities: research managers and administrators (RMAs). Despite being traditionally associated with supporting research projects at universities, research management and administration (RMA) has expanded its scope to encompass diverse facets, including research and innovation funding, science communication, science strategy support, knowledge and technology transfer, impact assessment, research project management,

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laboratory management, and other areas at the interface of science in all categories of research-performing organizations [5] and other science-related organizations such as research funding and science policymaking agencies [6]. RMA has emerged as a critical element not only in facilitating the implementation of research and innovation projects [7], but also in effectively communicating and demonstrating their outputs, outcomes and impacts [8]. With responsibility for funding schemes and research opportunities, RMAs increasingly oversee the management of a substantial sum of funds. Thus, ensuring organizational policies and practices that optimize RMA performance is increasingly crucial.

The motivation of teams significantly influences their performance, organizational outcomes in general, and the overall success of research endeavors [9]. Hence, there is a need to design incentive systems and management practices that align with teams' motivations. Motivation theories play a crucial role in understanding the behavior and performance of professionals across various fields. These theories provide insights into what drives individuals to perform and how these motivations can be harnessed to improve outcomes. In this study, we draw on the self-determination theory (SDT) to propose and validate a conceptual motivation framework for RMAs. SDT is a comprehensive macro-level theoretical framework on motivation, delving deeply into individuals' intrinsic propensities and psychological requisites that drive them to pursue challenges and immerse themselves in novel experiences, as elucidated by the seminal work of Ryan & Deci [10]. This influential theory notably differentiates between two distinct forms of motivation: autonomous (intrinsic) motivation, which is characterized by self-initiated engagement and personal volition, and controlled (extrinsic) motivation, which involves external pressures and obligations that guide behavior. Notably, SDT highlights the role of intrinsic motivation in job performance [11].

Motivation is a complex and multifaceted phenomenon. Besides external pressures (e.g., economic and political contexts) and factors such as organizational culture, individual differences as reflected, e.g., by personality traits and personal values, can influence teams' motivation. Personality traits such as conscientiousness, agreeableness, and openness to experience significantly influence intrinsic motivation, which in turn affects job performance and satisfaction [12]. Personal values such as openness to change, self-enhancement, and self-transcendence are positively associated with work engagement and motivation [13]. When personal values align with work values, employees experience higher job satisfaction and well-being [14].

The motivation aspects in research endeavors have seldom been approached in extant literature. Researchers' intrinsic motivation has been found to positively affect interdisciplinary and transdisciplinary research, while their extrinsic motivation mainly affects transdisciplinary research [15]. Santos et al. [16, 17] indicate that in collaborative research and innovation projects, industrialists and academics have significantly different, often conflicting motivations to be involved in this type of project. Industrialists are essentially motivated by business needs, whereas academics tend to be motivated by the need to publish papers for career progression purposes. Fontes & Franco [18] conducted an investigation into the underlying motivations that drive researchers to engage in collaborative research and development initiatives. They uncovered that the fundamental components of these motivations primarily encompass the prospect of making meaningful contributions toward the advancement of both scientific understanding and social progress, as well as the facilitation of knowledge generation that can lead to transformative impacts in various fields of study. To the best of our knowledge, no studies exist on the motivation profiles of RMAs. Moreover, to the best of our knowledge, no studies exist on the association between motivation profiles, personal values, and personality traits of RMAs.

This study explores the human and social dimensions of science and technology, focusing on RMAs as individuals who play a crucial role in shaping research and innovation ecosystems. Thus, it resonates with interest in the micro-level interactions, the dynamics within scientific communities, and the understanding of the cultural and social norms that shape scientific practices. Despite the critical function of RMAs in contemporary research and innovation ecosystems, studies focusing on their motivation profiles are absent from the literature. Furthermore, a notable deficiency exists in applying the pivotal concepts of personal values and personality traits within the RMA field, especially concerning their relationship with motivational profiles. To address this gap, this study draws on SDT as a macro-theory of motivation to propose and empirically test motivation profiles specifically for RMAs, introducing and validating the distinct profile of outcome-driven motivation. By examining the interplay of motivation, personal values, and personality traits, this research provides a framework to answer the fundamental question: *What motivates RMAs to take up such a role*?

From a practical standpoint, this study's results support the contingent theory view that organizations should adopt a flexible approach, tailoring motivational strategies to the specific context of each professional field. From a theoretical standpoint, this study contributes to extending and deepening the use of SDT in Science and Technology Studies by demonstrating its application in profiling the motivation of RMAs.

The manuscript is organized as follows. The subsequent section describes the background and constructs a theoretical framework concerning the various forms of motivation along the self-determination continuum for RMAs, as well as the relation between their personal values, personality traits, and the prominence of motivation profiles. Following this, the research methodology and the variables employed in the empirical investigation are presented, subsequently leading to an analysis of motivation profiles and their association with personal values and personality traits. The manuscript concludes with the principal findings, their theoretical and practical ramifications, and overarching conclusions.

2- Theoretical Background

2-1- Self-Determination Theory and the Research Endeavour

Motivation is an imprecise concept. In an everyday sense, it can be described as our desire to act [10]. SDT synthesizes a number of behavioral theories [19] and has been empirically tested over a significant period of time. In contrast to earlier theories regarding individual motivation that emphasized the quantity of motivation, SDT shifts the focus towards the nature and quality of motivation as predictors of learning and work performance [20]. A central tenet of SDT is that individuals possess innate tendencies and mechanisms to optimize their well-being, development, and motivation [10]. Two principal categories of motivation epitomize contrasting aspects of self-determination: autonomous and controlled [11]. Autonomous (or intrinsic) motivation arises when the individual's actions are aligned with their personal interests and values [21]. In contrast, controlled (or extrinsic) motivation denotes engagement in activities driven by an external source of pressure or reward, which serves to diminish autonomy and self-determination [10]. Black & Deci [22] argued that motivated behaviors vary in the degree to which they are autonomous versus controlled and distinguished extrinsic motivation into four regulatory styles (ranging from external to integrated regulation). Concisely, SDT encompasses various types of motivation that exist along a continuum [23], transitioning from more externally controlled to more intrinsically autonomous motivations, as illustrated in Figure 1: external regulation (incentives and penalties), introjection (concern for ego, self-esteem, and social approval), identification (motivation arising from increasingly aligned values), integration (a more thoroughly internalized version of identification), and intrinsic motivation (innate enjoyment and fulfillment).

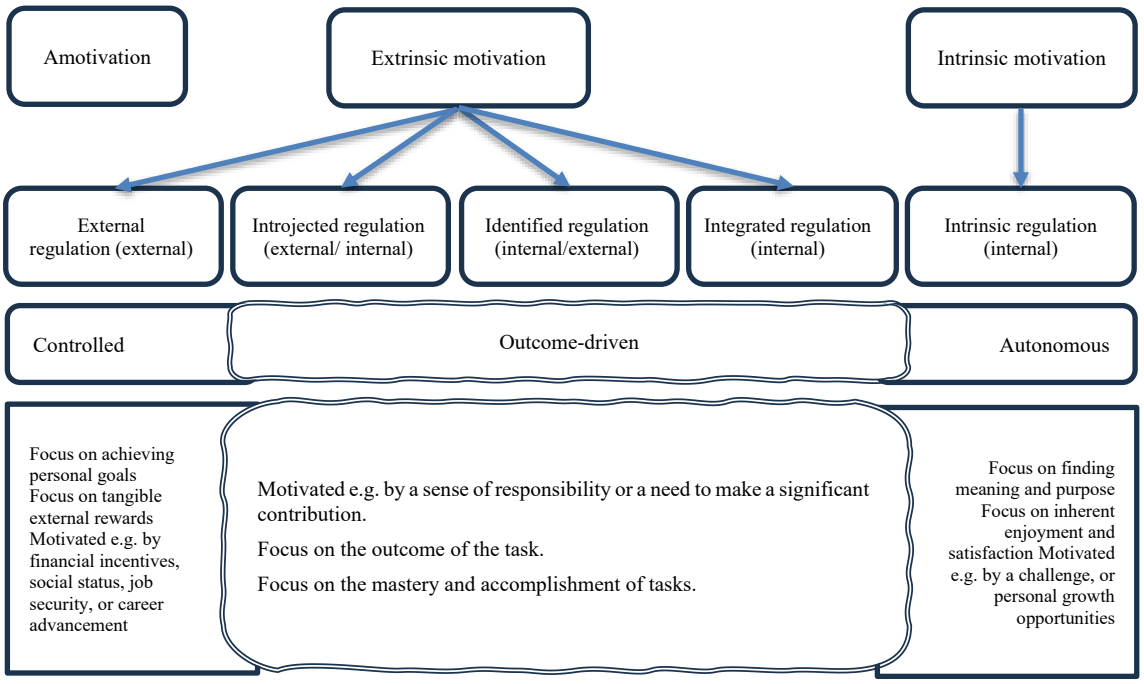

Figure 1. A conceptual framework for the motivation profiles of RMAs deducted from the SDT

SDT underscores the significance of autonomy, competence, and relatedness as essential psychological requirements that propel motivational states. It suggests that when these needs are met, individuals are more likely to be intrinsically motivated and perform better in their professional roles [10]. Autonomy refers to the individual's need for a sense of freedom to engage in activities according to their own will and choice; competence refers to the need for feeling effective and skillful in one's actions and controlling over the surrounding environment; relatedness refers to the need for support, care, and respect from the surrounding environment or others [24].

In the business world, work motivation theories have explored how motivation, along with ability, can drive performance. For example, the research of Van Iddekinge et al. [25] shows that ability and motivation are of equal influence when it comes to predicting job outcomes. In another example, Aryee et al. [26] found that intrinsic motivation mediated the influence of need satisfaction and trust in organization on job performance. Other topics within organizations that have been studied using SDT as a framework include, for example, knowledge sharing [21] and servant leadership [27].

In the research endeavor area, motivation has been studied, for example, in the context of citizen science [28, 29], green chemistry [30], interdisciplinary and transdisciplinary research [15], and collaborative research and development initiatives [18]. However, only a few examples exist of SDT being applied to understand motivation profiles in science

and technology-related professions. Basińska et al. [31] used SDT to study work motivation in universities, focusing on enhancing scientific effectiveness through autonomous motivation, controlled motivation, and amotivation. Their study highlights the importance of autonomy, mastery, and purpose in driving scientific productivity and international influence. In a study on high school students involved in a STEM enrichment program, Deemer et al. [32] found that satisfying the basic psychological needs for autonomy, competence, and relatedness increased their intrinsic research motivation and scientific research identity. SDT has also been applied to understand the motivation behind information-seeking behaviors in higher education [33]. This includes both controlled and autonomous motivations, which are essential for promoting lasting intrinsic motivation in research tasks. In related academic areas, SDT's principles have also been used to explore the psychological well-being and academic performance of students, emphasizing the importance of intrinsic and identified motivations [34]. To the best of our knowledge, SDT has not been used to study the motivation of RMAs.

2-2- Motivation Profiles of RMAs

Based on the SDT, a conceptual framework for motivation profiles to be tested for the RMA profession was developed and is illustrated in Figure 1. In particular, an outcome-driven motivation profile is proposed to define the space between extrinsic and intrinsic motivation in the specific case of RMAs.

Individuals driven by autonomous motivation engage in work for the inherent enjoyment and satisfaction derived from the activity itself [35]. They find meaning and purpose in their work and are often motivated by their profession's challenge, creativity, or personal growth opportunities. Autonomous motivation is associated with intrinsic forms of motivation, which are beneficial for long-term engagement and well-being [36]. Intrinsically motivated individuals tend to be more engaged, committed, and satisfied with their work, and they may be more likely to continue performing well even without external rewards [35]. This profile is linked to higher work performance and satisfaction, as well as lower levels of burnout and work addiction [37].

Controlled motivation is primarily extrinsic, focusing on tangible external rewards such as financial gain, prestige, social status, job security, or career advancement. Individuals with this profile may exhibit lower productivity and a greater likelihood of leaving for a new job due to their reliance on external incentives [38]. They may focus on completing tasks efficiently and effectively to achieve their goals, but their motivation may wane if external rewards are not forthcoming [39]. This profile is often associated with lower work satisfaction and higher burnout, as the motivation is not self-determined [40].

RMAs constantly work towards achieving specific outcomes, such as securing funding, managing budgets, ensuring compliance, and facilitating research projects [5]. Their success is often measured by the tangible results they produce, such as the number of grants awarded, the amount of funding secured, and the timely completion of research projects [41]. Furthermore, the increasing emphasis on research impact and accountability further reinforces the importance of outcomes in RMA [42]. Funding agencies and institutions are increasingly demanding demonstrable outcomes from research investments, requiring RMAs to be adept at tracking progress, measuring impact, and reporting on achievements. In this context, ‘outcome-driven’ motivation is herein defined as focusing on the accomplishment and command of tasks, driven by a sense of duty or responsibility, a desire to challenge or solve a particular problem, or a need to make a meaningful contribution. This profile can lead to high work performance, especially when tasks align with personal values [43]. In contrast to purely intrinsic motivation, outcome-driven motivation is more focused on the result of the task rather than the enjoyment of the process. However, if motivation is not supported by intrinsic interest (e.g., enjoying the process of solving a problem or creating something new), it may result in stress and decreased job satisfaction over time [38]. Moreover, outcome-driven motivation can have extrinsic elements (e.g., completing a task to receive rewards). Outcome-driven individuals may be more likely to prioritize efficiency and productivity over personal satisfaction, and their motivation may be influenced by external factors such as deadlines, feedback, or competition.

These motivation profiles can have different implications for RMA job satisfaction, engagement, and performance, and understanding an individual's motivation profile can help managers and organizations design more effective strategies to motivate and engage their workforce [35].

2-3- Personal Values and Personality Traits

Values are cognitive structures that facilitate adaptive behavior and social interaction [44]. As the most abstract level of social cognition, they serve as the building blocks for attitudes and behaviors, influencing our responses to environmental stimuli [45]. Values are socially acquired beliefs that should be distinguished from innate personality dispositions [46] and, therefore, can be trained or developed. They are likely to be universal, with factors such as the needs of individuals as biological organisms, the requisites of coordinated social interaction, and the survival and welfare needs of groups contributing to their widespread recognition. Personal values are conceptualized within several frameworks, the most recognized being Schwartz's Values Theory [47, 48] as a measure of stable, underlying value

structures as opposed to situational work-related values [49]. It is widely adopted due to its emphasis on broad motivational values that underpin human behavior. Schwartz's universal values are organized along the following dimensions: Self-Direction, Stimulation, Hedonism, Achievement, Power, Face, Security, Tradition, Humility, Conformity, Universalism, and Benevolence [48, 50].

Prior research suggests that intrinsic motivation is closely related to personal values. In a study involving project managers, Modranský & Lajčin [51] found significant relationships between commitment and power and success; flexibility and stimulation; universalism and benevolence; self-control and power, success, conformity, and safety; and confidence in success and power and success and stimulation. Intrinsic motivation aligns closely with self-transcendence values, which emphasize the welfare of others and the environment. These values include benevolence and universalism, which are inherently satisfying and fulfilling, thus fostering intrinsic motivation [52]. Values such as self-direction and stimulation are linked to intrinsic motivation, as they promote autonomy and personal growth [53]. Individuals motivated by these values are likely to engage in activities that they find inherently interesting and enjoyable. While there is no direct study on Schwartz's personal values in the research professions, the existing literature on other professions suggests that such values are likely to play a significant role in shaping professional behavior and decision-making. Lu & Zhang [54] examined the integration of teacher and researcher identities among 'English as a Foreign Language' teachers, highlighting the role of personal values and beliefs in professional development and identity construction. This suggests that personal values are relevant in academic settings, though not specifically focused on research contexts.

Personality is a complex construct reflecting stable individual differences in thoughts, feelings, and behaviors. The Big Five personality traits, also known as the Five-Factor Model, were introduced by the American psychologist Lewis Goldberg and are a widely recognized framework for understanding personality [55]. Extraversion reflects the capacity to actively connect with others, including conversational skills, persuasive ability, and leadership. Agreeableness represents capacities to preserve constructive social interactions, such as viewpoint-taking, trust, and teamwork. Conscientiousness involves the capacity to successfully execute plans and deliver results, including time management, organization, and consistency. Neuroticism includes abilities to manage emotions effectively, such as stress and anger management. Openness to Experience involves capacities to be open to innovation and change, including abstract thinking and creativity. These traits are believed to be relatively stable throughout adulthood and have been shown to influence various life outcomes, including job execution and leadership effectiveness [56]. In job performance studies, conscientiousness has been found to be relevant in most professions, while extraversion is a more effective predictor in occupational groups such as managers and sales personnel, where social interaction is important [15].

Personality-oriented approaches to motivation, such as the Reversal theory, propose that it is influenced by the interplay between different motivational states, such as goal-oriented and activity-oriented [57]. These approaches suggest that motivation is shaped by individual personality traits and cognitive ability [58]. Individuals with high cognitive ability exhibit a more differentiated personality structure, highlighting the importance of considering both cognitive and personality factors in job performance prediction [58]. Moreover, it suggests that personality traits like conscientiousness and agreeableness are important in driving motivation. In the research endeavor context, the personality-oriented approach has been used, for example, by Katoh et al. [15] to investigate the role of researchers' personality traits in promoting interdisciplinary and transdisciplinary research collaboration and project success. They showed that a collaborative working culture in research can foster a sense of teamwork and motivation among individuals with high agreeableness. They also found that intrinsic motivation in researchers is correlated with agreeableness, conscientiousness, neuroticism, and openness to experience.

Notwithstanding the aforementioned studies, there exists a notable deficiency in the application of the pivotal concepts of personal values and personality traits within the research endeavor area, namely in the RMA field, and their relationship with motivational profiles.

3- Research Methodology

Our investigation employs a post-positivist framework, positing that it is feasible to draw substantiated conclusions regarding a phenomenon through the integration of empirical evidence and rational analysis [59]. A quantitative survey questionnaire was used to collect empirical data. The unit of analysis is the individual research manager and administrator within a single cross-sectional study.

3-1- Survey Questionnaire

Based on the conceptual framework for the motivation profiles of RMAs deducted from SDT (Figure 1), a construct for each type of motivation profile was developed. The measurement items (Table 1) were formulated by reviewing similar studies on motivation profiles [60, 61]. Note that the questionnaire used the term Research Administrator (RA), which is more common in the US, rather than the more international of Research Manager and Administrator [62], in order to align with the funder's terminology.

Table 1. Measurement items for each motivation profile construct

Controlled motivation	Outcome-driven motivation	Autonomous motivation
1. I can see how my work contributes to the field of research administration	6. The senior leadership team in my organization understands the importance of research administration	11. I find it important that the field of research administration is widely acknowledged
2. Others around me value my contributions	7. My work is clearly defined in my job description	12. I believe that the RA profession contributes to the excellence of research and innovation ecosystems
3. I can be creative about how I perform many tasks related to my role	8. The research community is interested in my role	13. My work inspires others to consider better practices
4. I feel confident that I have the knowledge, skills, and/or abilities that I need for my role	9. My organization has research administration in its priorities	14. The profession of research administration is important to me
5. I am inspired by the people around me	10. Research administration is part of the culture of my organization	15. I am able to clearly articulate how research administrators add value to the research and innovation ecosystem

Based on the methodology outlined by Schwartz [63], and due to the quasi-circumplex structure of personal values, the prescribed method of scoring and analyzing the personal values data was adhered to. The measurement items were adapted from prior research [50]. Due to the wide acceptance and proven validity and reliability of the standard Big Five personality traits measurement items used, the method of scoring and analyzing each attribute was also adopted in this case. The measurement items were adapted from preceding literature [64].

The survey questionnaire included sections designed to study the conceptualized motivation constructs (Table 1), the standard personal values, and personality traits. The participants were instructed to respond to all statements using a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Also, data were collected on respondents' general demographic information, namely age (range), gender identity, role level, and country of work. Before disseminating the questionnaire, a preliminary pilot was undertaken, during which a draft version was evaluated by specialists in the field. These experts were requested to assess the document and endow constructive critiques regarding the appropriateness of the language utilized, the content validity of the questionnaire, the sequencing of the inquiries, and its overall comprehensiveness. The questionnaire was subsequently amended accordingly. In addition to English, a Spanish (Latin American) translated version was also made available. The survey was conducted online (July-November 2023) utilizing a web-based application in Qualtrics through an anonymous link to ensure the integrity of standardized and confidential data collection [65]. Participants were engaged through snowball sampling, a nonprobability methodology. The survey was disseminated using LinkedIn and mailing lists of RMA associations (e.g., NCURA, EARMA). A total of 1,095 valid (100% progress) responses were obtained (reference omitted for blinded review). The quantitative data were analyzed using IBM SPSS Statistics v27.

3-2- Statistical Analyses

Exploratory Factor Analysis (EFA) was used to examine the underlying factor structure of the theoretical constructs. The principal component method was used with Varimax rotation. Two key statistical measures were employed to evaluate the suitability of the data for factor analysis: the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. Communalities were then analyzed to determine the variance each item shared with the overall factor structure. The rotated component matrix was examined to identify factor loadings. Item-to-item and item-to-total correlations were used to assess internal consistency reliability. High positive correlation coefficients between each pair of items could be observed, indicating that items measure similar constructs and contribute to internal consistency. Cronbach's alpha was computed to assess the overall internal consistency of the multi-item factors (Table 3).

Levene's test was used to assess if the variances of variables were equal across groups. The homogeneity of variance assumption was not validated ($p < 0.001$) for all the variables studied. The data normality was confirmed by determining their kurtosis and skewness. To look for statistically significant differences between groups, the ANOVA with Games-Howell post hoc test was used due to the observed deviations from non-homogeneity of variances.

3-3- Respondents Characterization

Table 2 summarizes the respondents' demographic characteristics. Most respondents were between 35 and 54 years old, and leaders and managers accounted for 61.7% of the total sample. This indicates significant expertise and reliability. The observed gender imbalance is typical of the research managers' profession in general [66]. The geographical distribution was focused on the USA.

Table 2. Summary of respondents' demographic information (n= 1,095)

Demographic	Summary of respondents
Age (years old)	
< 35	8.8%
35-44	30.9%
45-54	35.8%
55-64	17.9%
>64	5.4%
NP*	1.3%
Gender	
Male	16.1%
Female	80.8%
Non-binary	1.1%
NP*	2.0%
Country of work	
USA	62.1%
Colombia	6.3%
UK	6.1%
Canada	6.0%
Other	19.5%
Role level	
Leader	24.6%
Manager	37.1%
Operational	33.8%
Assisting	1.7%
NP*	2.8%

* NP: not provided.

4- Findings

The following variables were used as statistical control variables in the core analysis of motivation profiles, personal values, and personality traits: age range, gender identity, the area(s) of RMA that the respondents work in, and membership of professional RMA associations. No influence could be observed on the data analysis.

Significant item-to-item correlations were observed (in more than 50% of the cases; $p < 0.001$; coefficient values > 0.3), thus allowing us to proceed confidently with factor analysis. The KMO value (0.915) and Bartlett's Test of Sphericity ($p < 0.001$) results confirm the data suitability for EFA [67]. Items 5 and 7 (Table 1) were removed because their communality values were lower than 0.5. This resulted in a total explained variance improvement from 57.2% to 60.9%. Three factors were identified with eigenvalues greater than 1. Table 3 collects the loading values of each item per factor (rotated component matrix). It can be observed that Cronbach's alpha for each factor is above the 0.5 minimum and the 0.7 desired thresholds [68], which means the results are reliable.

The factor structure validates the proposed theoretical construct of three main motivation profiles for RMAs. The general distribution of items per factor group is followed, except for items 1 (moved from controlled to autonomous motivation), 8 (moved from outcome-driven to controlled) and 13 (moved from autonomous to controlled motivation). This is consistent with the observation that the controlled motivation items are centred around the self/personal dimension, the outcome-driven motivation items are centred around the organizational dimension, and the autonomous motivation items are centred around the systems level (intrinsic contribution to and value of the RMA profession) (Figure 2).

Table 3. Exploratory factor analysis results

	Item	Controlled motivation	Autonomous motivation	Outcome-driven motivation
Controlled motivation	1. I can see how my work contributes to the field of research administration	-	0.575	-
	2. Others around me value my contributions	0.689	-	-
	3. I can be creative about how I perform many tasks related to my role	0.650	-	-
	4. I feel confident that I have the knowledge, skills, and/or abilities that I need for my role	0.704	-	-
Outcome-driven motivation	6. The senior leadership team in my organization understands the importance of research administration	-	-	0.860
	8. The research community is interested in my role	0.498	-	-
	9. My organization has research administration in its priorities	-	-	0.886
	10. Research administration is part of the culture of my organization	-	-	0.848
Autonomous motivation	11. I find it important that the field of research administration is widely acknowledged	-	0.746	-
	12. I believe that the RA profession contributes to the excellence of research and innovation ecosystems	-	0.771	-
	13. My work inspires others to consider better practices	0.627	-	-
	14. The profession of research administration is important to me	-	0.736	-
	15. I am able to clearly articulate how research administrators add value to the research and innovation ecosystem	-	0.531	-
	Variance %	7.878	12.944	40.056
	Cumulative %	7.878	20.822	60.878
	Cronbach Alpha	0.757	0.774	0.880

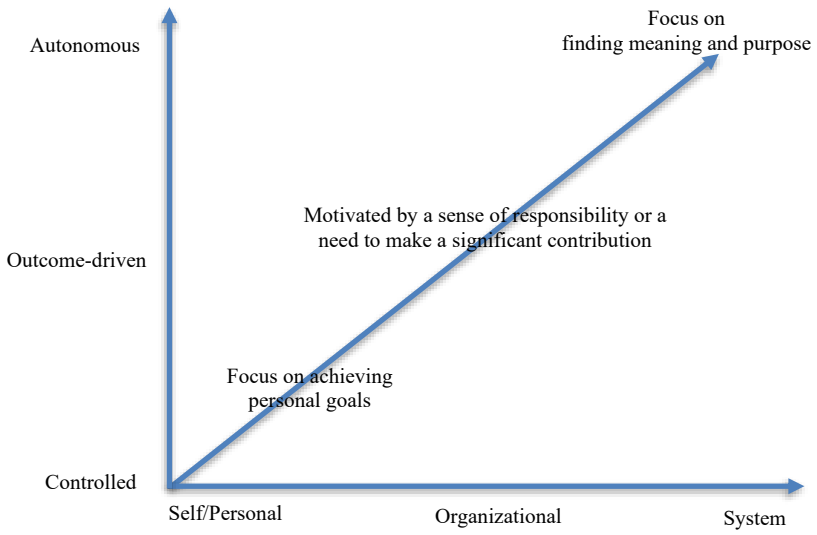

Figure 2. Relationship between motivation profiles and influence/effect dimensions

Based on the EFA results, three new variables were computed ('controlled motivation', 'outcome-driven motivation, and 'autonomous motivation') as the arithmetic mean of the corresponding factor items. These variables allowed us to quantify the mean motivation profile of the respondents. Table 4 summarizes their main descriptive statistics. The ANOVA results indicate statistically significant differences between the three motivation profiles ($F(2) = 242.020$, $p < 0.001$). The Games-Howell post hoc test showed statistically significant differences between all the motivation profiles (at the 0.01 level). It can be observed that the autonomous profile scores the highest, suggesting that the respondents are generally more intrinsically motivated than controlled or outcome-driven.

Table 4. Descriptive statistics for the mean values of motivation profiles (n=1,095)

	Controlled motivation	Outcome-driven motivation	Autonomous motivation
Mean	4.0781	3.6216	4.3671
Std. Deviation	0.62915	1.07446	0.60250

Additionally, the empirical data was filtered according to the predominance of each of the motivation profiles (Figure 3). For example, the predominantly controlled respondents were selected when the score of the controlled motivation variable was greater than those of the outcome-driven and autonomous motivations. Those respondents who did not show a predominant motivation profile (e.g., those who scored equally high on at least two motivation profiles) were labeled 'No Single Predominance'. In Figure 3, it can be observed that most respondents show a predominantly autonomous profile (confirming the mean motivation profile results), followed by those respondents who do not show a predominant motivation profile. The latter observation suggests that the motivation profiles of these professionals are significantly hybrid.

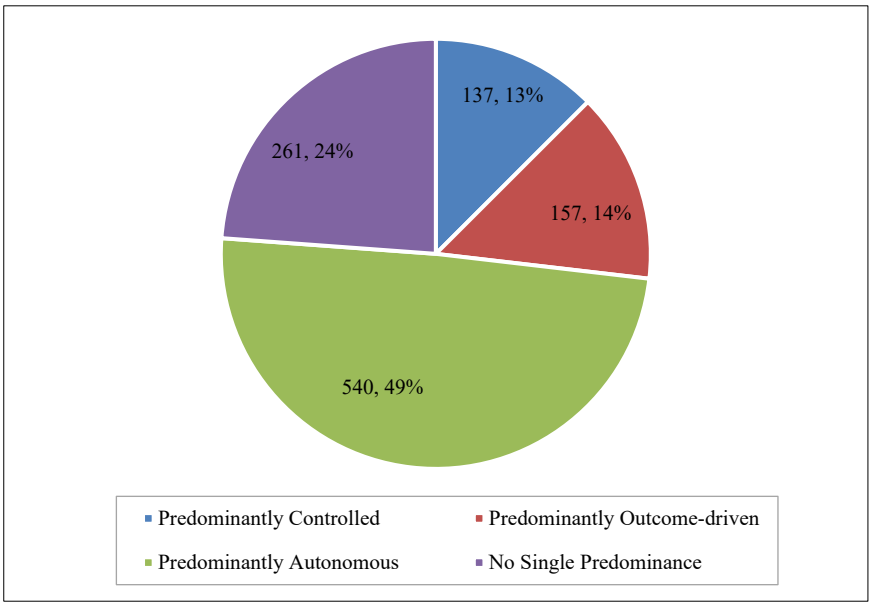

Figure 3. Representativeness of motivation profiles

5- Discussion

5-1- Motivation Profiles

The empirical results align the motivational landscape of RMAs with those of related professional roles discussed in previous studies. The identification of a predominantly autonomous (intrinsic) drive is consistent with findings in project management literature, where intrinsic motivation is cited as a key factor in driving behavior and is a better predictor of task performance than extrinsic motivation. Similarly, the strong presence of intrinsic factors supports studies applying SDT in university settings, which emphasize that autonomy, mastery, and purpose are crucial for enhancing scientific effectiveness. The analysis further reveals that the RMAs' lowest score in controlled motivation mirrors previous observations in the research project manager profession, where extrinsic factors like adequate pay and stability are considered 'hygiene' factors rather than primary motivators. This consistent finding suggests that for project-based professionals, including RMAs, external rewards are necessary conditions that enable, but do not drive, the intrinsic engagement characterized by the fulfillment of the SDT needs for autonomy, competence, and relatedness. This comparison strengthens the argument that RMAs are driven by self-initiated engagement and inherent job satisfaction.

Prior research recognizes that project managers typically exhibit a combination of motivation profiles [61]. The results in Table 4 and Figure 3 indicate that this is also the case with RMAs, although a leading intrinsic motivation profile can be identified (Figure 4).

Predominantly autonomous and predominantly controlled-motivated respondents show a low outcome-driven motivation when compared with the mean value. This further validates our conceptual model (Figure 1), proposing the latter as separate but contiguous to the autonomous and controlled motivation profiles. Moreover, the predominantly controlled motivation profile scores lower in autonomous motivation than the predominately outcome-driven profile. Thus, the results show that the latter is closer to the autonomous motivation than to the controlled motivation profile, i.e., the outcome-driven profile shows more traits of intrinsic motivation than of extrinsic motivation. This is aligned with the finding that extrinsic motivation aspects (e.g., rewards) are a valid, albeit secondary, source of motivation in international project teams [69].

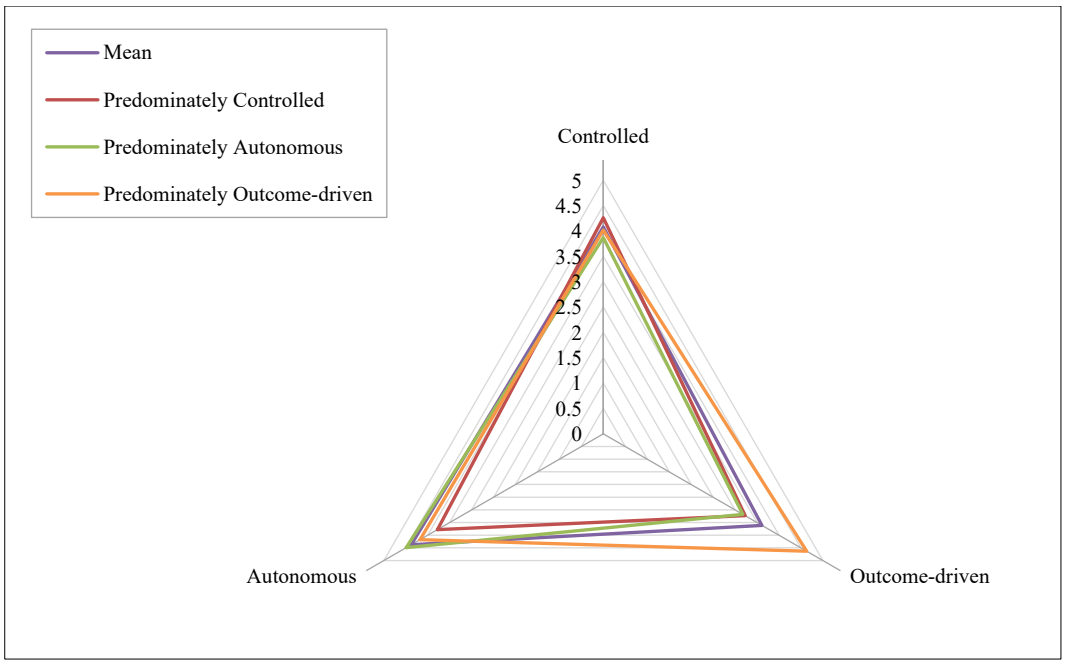

Figure 4. Motivation profiles of RMAs

Although the RMA and project management professions differ in scope, the lack of prior motivation studies on RMAs, combined with their frequent involvement in collaborative research projects, calls for comparative analysis.

Previous research suggests that intrinsic motivation is a key factor in driving project managers' behavior and decision-making [37]. For example, intrinsic motivators were found to be more influential than extrinsic motivators in global project teams [69]. Intrinsic motivation has also been found to be a better predictor of task performance than extrinsic motivation [70]. Laghbari et al. (2020) [71] found that factors such as achievement (related to competence) and relationships with colleagues (associated with relatedness) were identified as significant motivators that improve project performance. Moreover, Nicklich et al. [72] have demonstrated that project managers experience a substantial level of autonomy and self-governance in their professional responsibilities, as well as in their selection of methods for executing various tasks inherent to their position. These results are aligned with the three fundamental psychological needs that, according to the SDT, drive autonomous motivation [24]. Thus, our empirical results on RMAs are aligned with prior studies on the related profession of project management.

Our results indicate that outcome-driven motivation in RMAs is expressed less than autonomous motivation. It does, however, stand out as an independent and significant motivation profile for these professionals. Outcome-driven motivation focuses on the intrinsic and extrinsic factors that drive individuals to complete tasks. Previous research findings suggest that tasks possess an inherent motivational aspect [73]. Thus, when the task is perceived as significant, engaging, and comprehensible, it has the potential to positively impact the motivation of RMAs. In the project management area, as posited by Beecham et al. [73], this encompasses possessing a lucid comprehension of the assigned duties, generating measurable outcomes, observing advancements in the ongoing project, having the capacity to apply personal skills and competencies, experiencing a diversity of tasks, and engaging in critical assignments.

The lowest controlled motivation character of RMAs is justified by the extrinsic character of motivation factors such as authority, security, stability, career progression opportunities, status, and adequate pay, whose absence is also often characterized in the research of project managers [74]. Research by Seiler et al. [60] indicated that elements associated with remuneration were deemed the least significant motivators for project managers. Moreover, monetary rewards have been found to be a baseline driver and an enabler of higher-level, intrinsic motivations in project managers [75]. Thus, these factors act as a necessary condition (i.e., ‘hygiene’ factors in Herzberg's Motivation-Hygiene theory). This is in agreement with a study in the health sector in Rwanda [76], where recognition (intrinsic motivation) was found to significantly boost project performance but lead to better project outcomes only when the extrinsic motivation factors of career development opportunities and job security exist.

These empirical results provide key interpretations regarding the professional drive of RMAs within the SDT framework. The finding that the average profile is hybrid but predominantly autonomous-driven confirms a leading intrinsic motivational focus, which may be induced by the socially desirable perception of intrinsic motivation within professional roles. Furthermore, the low scoring in controlled motivation reinforces the conclusion that extrinsic factors, such as adequate pay, security, and career progression, act primarily as necessary conditions or ‘hygiene’ factors rather than primary drivers, a characteristic observed in related project management professions. Crucially, the validation of the outcome-driven profile as separate but contiguous to the autonomous and controlled profiles confirms its role in defining the space between these established SDT motivations, displaying more traits of intrinsic motivation than extrinsic motivation.

5-2- Personal Values vs. Motivation Profiles

Figure 5 presents the respondents' scoring for Schwartz's personal values relating to each predominant motivation profile.

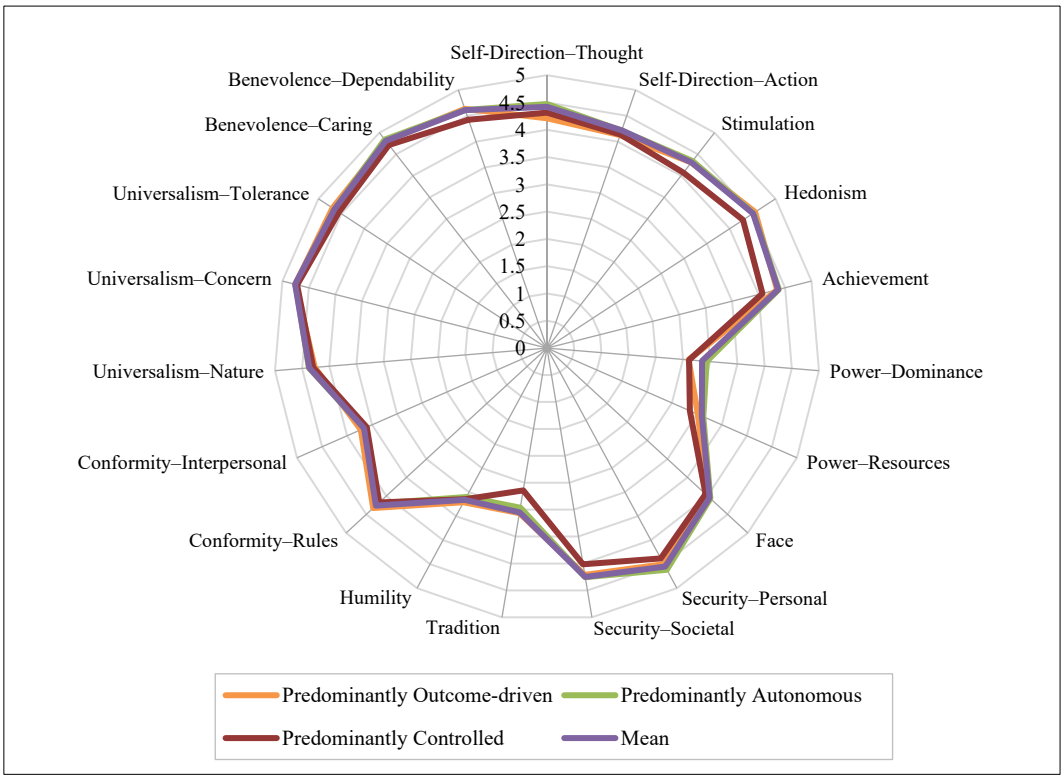

Figure 5. Schwartz's personal values of RMAs

Although the general trends for personal values do not appear to differ between individual predominant profiles and the mean profile (Figure 5), the following differences were found to be statistically significant (ANOVA with Games-Howell post hoc test).

Predominantly autonomous-motivated profiles consider more important, and predominantly controlled-motivated consider less important, the values of Benevolence-caring, Benevolence-dependability, Self-direction-thought, Stimulation, Hedonism, Achievement, Power-Resources, Security-Personal, Security-Societal, Power-Dominance, and Tradition.

Autonomous motivation arises when the individual's actions are aligned with their personal values [21, 51]. The values emphasized by autonomous-motivated individuals all align with the fulfillment of the basic needs identified by SDT (autonomy, competence, and relatedness). Benevolence-caring and Benevolence-dependability reflect a concern for others and a desire to contribute to their well-being. This aligns with the need for relatedness and the intrinsic satisfaction derived from positive social interactions [77]. Self-direction thought emphasizes independent thinking and autonomy in exploring ideas, directly supporting the need for autonomy and self-determination [78]. Stimulation represents a desire for challenge and novelty, which can contribute to feelings of competence and mastery [79]. Hedonism and achievement are linked to the pursuit of pleasure and accomplishment, both of which can be intrinsically motivating and contribute to a sense of competence and self-efficacy [80]. Power-Resources, Security-Personal, and Security-Societal reflect a desire for safety and stability, which can create a secure foundation for pursuing autonomous goals [78]. Power-Dominance can be interpreted as a desire to influence and effect change, aligning with the need for autonomy and the pursuit of meaningful goals. Tradition provides a sense of continuity and belonging, contributing to feelings of relatedness and social connection.

Conversely, controlled-motivated individuals, who prioritize external rewards and pressures, may find these values less important because they may perceive them as distractions from meeting external expectations or as potential threats to their need for control and security [81]. Albeit the differences in scope between the RMA and the project management professions, prior research highlights that the personal values of project managers, such as Benevolence, are more important for their managerial work than controlled-related motivation [51]. This is also evident in the case of RMAs. Also, project managers who are intrinsically motivated tend to have a different set of values that are more aligned with their role than those that show an extrinsic motivation profile [61]. This is posited to be the case also for RMAs.

Outcome-driven-motivation respondents consider less important Self-direction-thought, Power-Dominance, and more important Benevolence-dependability, Stimulation, Hedonism, Achievement and Tradition. Outcome-driven individuals are primarily motivated by the anticipated consequences of their actions, both intrinsic and extrinsic. This motivational orientation shapes their value priorities in a distinct way. It reflects their pragmatic and goal-focused approach. They value collaboration, appreciate the excitement of the challenge, and see achievement as a key measure of success. While they may not prioritize independent thought or dominance, they recognize the importance of strong relationships and established practices in achieving desired outcomes. This interpretation is consistent with SDT's emphasis on the importance of fulfilling basic psychological needs for autonomy, competence, and relatedness in fostering motivation and well-being.

5-3- Personality Traits vs. Motivation Profiles

Figure 6 presents the respondents' scoring for the Big Five personality traits relating to each predominant motivation profile.

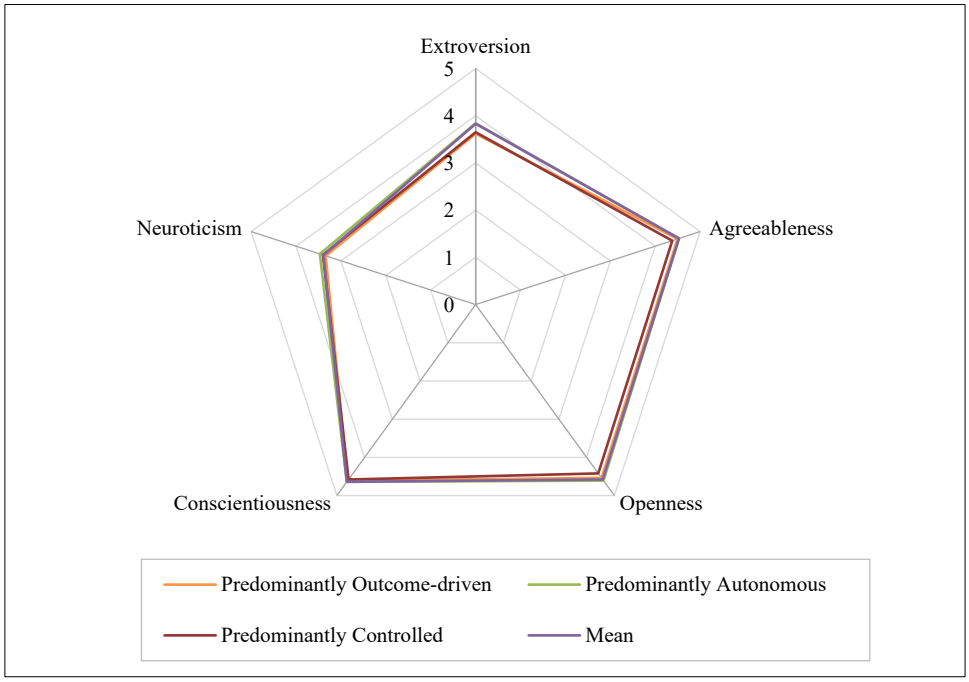

Figure 6. Big Five personality traits of RMAs

Although the general personality traits trends do not appear to differ between individual predominant motivation profiles and the mean profile (Figure 6), the following differences were found to be statistically significant.

Openness is higher for predominantly autonomous-motivated respondents and lower for predominantly controlled-motivated respondents. This finding is supported by previous research. A study by Audet et al. [82] found that Openness to Experience was positively associated with autonomous motivation for online learning. Another study by Judge & Ilies [55] found that Openness was positively related to intrinsic achievement motivation, which aligns with the concept of autonomous motivation. In academic settings, Komarraju & Karau [83] found that Openness in university students is positively associated with intrinsic motivation and adaptive learning strategies. In the research endeavor area, Feng et al. [84] found that Openness to Experience predicts high productivity. Individuals high in Openness are likely to be drawn to RMA roles due to the intellectual stimulation and the opportunity to engage in creative problem-solving. Their inherent curiosity and desire for autonomy may lead them to thrive in environments that support self-direction and independent thinking, fostering autonomous motivation. Conversely, those with lower Openness may find the unpredictable nature of research and the need for constant adaptation challenging. They may prefer more structured environments with clearly defined roles and expectations, which could contribute to a greater reliance on controlled motivation. Those with lower Openness might be more susceptible to external pressures and controls, leading to controlled motivation [85]. Controlled motivation, coupled with low Openness, could hinder innovation, limit the exploration of new research avenues, and create a research culture that prioritizes conformity over creativity. However, it is important to acknowledge that different levels of Openness might be beneficial at different career stages, suggesting the need for a nuanced understanding of its impact on research leadership.

Extroversion is higher for predominantly autonomous-motivated respondents and lower for predominantly outcome-driven-motivated respondents. RMAs who are primarily driven by autonomous motivation may exhibit higher

Extroversion due to their inherent interest in research and their enjoyment of collaborative endeavors. They may thrive in environments that foster creativity, intellectual stimulation, and social interaction, which are often associated with research settings. In fact, prior studies have shown a positive association between Extroversion and intrinsic motivation, with individuals high in Extroversion being more likely to engage in activities for inherent satisfaction and enjoyment [86]. Also, extroverted individuals may be particularly well-suited for leadership roles in research settings, where ambiguity and the need for autonomy and independent decision-making are often present [80]. RMAs with a stronger focus on outcome-driven motivation demonstrate lower Extroversion due to their prioritization of achieving specific goals and meeting deadlines, which may involve more independent work and a greater emphasis on individual performance. While they may still value collaboration, their primary focus on outcomes might lead to a less pronounced need for social interaction and a more reserved demeanor compared to their autonomously motivated counterparts. Moreover, lower Extroversion suggests that in research settings, where deep focus, analytical thinking, and meticulous attention to detail are highly valued, introverted tendencies might actually be advantageous for achieving desired outcomes. These individuals may excel at setting clear goals and objectives, developing and implementing efficient strategies, and monitoring progress while making necessary adjustments [87]. However, organizations should be mindful of the potential challenges associated with low Extraversion in leadership roles, such as difficulties with team dynamics and relationship building.

5-4- Theoretical Contributions

This study contributes to the extension of SDT to RMA to explore its potential applications and benefits in this field. Specifically, our results validate the proposed conceptual framework for motivation profiles of RMAs deducted from SDT, consisting of three distinct types of motivation: controlled (extrinsic), outcome-driven (intrinsic-extrinsic), and autonomous (intrinsic). Accordingly, we developed and verified a scale instrument for empirical measurement purposes.

5-5- Practical Contributions

Our empirical results can be applied to design organizational policies that ensure extrinsic factors such as career stability and progression opportunities and simultaneously enhance RMAs´ intrinsic motivation factors, thus leading to improved productivity and well-being. Specifically, initiatives aimed at granting individuals the autonomy and liberty to make decisions and assume responsibility for their duties, alongside opportunities for skill enhancement and competency development, while cultivating a sense of connectedness through teamwork, collaboration, and recognition, which all have been substantiated to result in higher motivation and performance [88].

6- Conclusion

This research successfully extends Self-Determination Theory to the field of Research Management and Administration by proposing and validating a novel conceptual framework for understanding professional motivation where prior literature was absent. Central to this framework is the introduction of outcome-driven motivation, a profile specifically designed to define the space between purely extrinsic and purely intrinsic drives, focusing on the accomplishment and command of tasks and contribution to organizational goals. Empirical testing confirmed the existence of three distinct profiles - controlled, outcome-driven, and autonomous - with the average RMA profile being significantly hybrid but predominantly autonomous-driven. This indicates that RMAs are fundamentally motivated by intrinsic satisfaction, self-initiated engagement, and the perception of their value to the wider research ecosystem. Consistent with findings in related project management professions, controlled (extrinsic) motivation scored the lowest, confirming that factors such as security, stability, and adequate pay function primarily as necessary ‘hygiene’ factors rather than primary performance drivers. The validated outcome-driven profile is situated closer to the autonomous profile, reflecting a pragmatic, goal-focused approach that values achievement and organizational contribution.

The detailed analysis of individual characteristics revealed a strong alignment between motivational profiles and dispositional traits. Autonomously motivated RMAs place higher importance on self-transcendence values, such as benevolence and universalism, reflecting a desire for positive social interaction and meaningful contribution. Their corresponding personality structure features high conscientiousness, openness to experience, and agreeableness, suggesting a capacity for independent thinking, creative problem-solving, and thriving in collaborative environments that support self-direction. Conversely, controlled-motivated RMAs display lower openness and may prefer structured environments, relying more on external controls. These findings provide crucial practical contributions for organizations, necessitating a flexible approach to human resource management. To enhance RMA performance and well-being, organizational policies must secure extrinsic factors while actively cultivating intrinsic motivators. This involves implementing initiatives that grant greater autonomy and liberty in decision-making, providing opportunities for skill enhancement and competency development, and fostering a strong sense of relatedness through teamwork, collaboration, and recognition. Ultimately, this framework supports the design of targeted motivational strategies that align with the intrinsic drive essential for this critical profession at the interface of science.

6-1- Limitations and Future Work

Motivation represents a nuanced construct open to distinct interpretations by each individual. As a psychological phenomenon, it is acknowledged to fluctuate over time. The methodology employed for data collection in this study relied solely on cross-sectional assessments from the sample population. A more longitudinal approach is advisable for subsequent investigations. Furthermore, adopting an interpretive framework incorporating interviews for qualitative analysis may yield even more profound insights for future inquiries. Further studies could also investigate how SDT can be used to design and implement specific RMA practices that promote employee motivation, productivity, and well-being. Moreover, future research could explore potential cultural or contextual factors and attributes, such as geographical location, that may influence the relationship between values, personality, and motivation.

The use of snowball sampling, a nonprobability methodology disseminated through professional channels such as LinkedIn and RMA association mailing lists, introduces a potential selection bias. This approach may over-represent professionals who are highly engaged in these networks or belong to specific geographical regions, potentially limiting the generalizability of the results and contributing to the observed geographic concentration of respondents in countries like the USA. A more rigorous probability sampling technique would be advisable in subsequent investigations.

7- Declarations

7-1- Author Contributions

Conceptualization, J.S., M.F., and S.K.; methodology, J.S., M.F., and S.K.; formal analysis, J.S., M.F., and S.K.; investigation, J.S., M.F., and S.K.; data curation, J.S., M.F., and S.K.; writing—original draft preparation, J.S.; writing—review and editing, M.F. and S.K.; visualization, J.S.; project administration, M.F.; funding acquisition, M.F. All authors have read and agreed to the published version of the manuscript.

7-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7-3- Funding

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7-4- Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the Clemson University (IRB00000481, June 14, 2023) for studies involving humans.

7-5- Informed Consent Statement

Informed consent was obtained from all subjects involved in the study

7-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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