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Protean Career Development Among Ph.D. Management Graduates: Self-Directed and Adaptable Ways of Navigating a Career

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ABSTRACT

This paper investigates the protean career development behaviors of Ph.D. Management graduates take charge of and steer their careers through learning, adaptability, and application based on personal value congruence. Using PCA and descriptive statistics, it reports some of the most critical factors influencing the choice of work, development of skills, and readiness to adapt to new ones. These findings insist that continuous learning, self-confidence, and career flexibility are essential for graduates, indeed all about lifelong learning and proactive career management. The present study emphasizes competencies developed in the process, which includes 21st Century Skills, including self-direction, applied quickly in a professional setting by the graduates. In this view, suggestions are made to improve the status of Ph.D. programs, ensuring more significant support for protean career behaviors.

KEYWORDS- Protean Career Development, UNSDG no. 4, Ph.D. Management Graduates, Principal Component Analysis (PCA)

1. INTRODUCTION

The issues that are graduating students from Ph.D. programs in Management come in multifaceted and significant dimensions. Regarding Protean Career Development, there has been a growing importance of adaptability and self-directed Management of careers for Ph.D. graduates who must navigate through the competitive yet, at times, unreliable job market.

One of the significant concerns is how the job market treats the graduating Ph.D. students as if with uncertainty. Recent research showed that around 40% of Ph.D. graduates could not find employment in their research area even a few years after finishing their degrees (Pham, 2023). This situation is further compounded by the highly competitive nature of academic positions, with an estimated ratio of about six applicants for every available academic job in management disciplines (McAlpine & Montserrat Castelló, 2024). The shortage of tenure-track positions forces graduating students to seek other careers, many of which are probably beyond academia. They may not be the careers at which they had set their career sights (Lawson & Lopes-Bento, 2024).

Today, many Ph.D. graduates graduate with the feeling that they are not prepared to enter the workforce. According to another survey, more than 60% of the Ph.D. graduates believed their graduate programs did not prepare them for working outside academia (Tyson et al., 2020). This gap in preparation is especially evident in areas such as networking and job search strategies (Thiry et al., 2015). Many students lack appropriate professional networks beyond academia, which is crucial in securing industry or management positions (Mauldin, 2019). Also, only 25% of Ph.D. programs offer professional development training tied to these skills, so most graduates must find ways to transition into the job market (Norman-Burgdolf & Vanderford, 2016). The psychological burden of undertaking a Ph.D. is also very weighty. Research shows that about half of all Ph.D. students suffer from anxiety and depression during their study, with ramifications on job search and career satisfaction (Hazell et al., 2020), (Halat et al., 2023).

Pressure to publish from journals and high standards from the academic fraternity contributes to this stress, leading to burnout and a lack of enthusiasm as they are released into the job market. Furthermore, many graduates face imposter syndrome, feeling unworthy of their accomplishments and doubting their capabilities in professional settings (March-Amengual et al., 2022), (Bravata et al., 2019), (McLean Hospital, 2023).

In the context of Protean Career Development, adapting is essential. Graduates must proactively seek diverse career opportunities and develop transferable skills that can be applied across various industries (Gubler et al., 2014). For example, though a doctorate holder has excellent research and analytical skills, they need more robust project management, leadership, and communications skills to make the right employers come to their page (Murat et al., 2019). A study indicates that graduates who are 'active networkers' and seeking mentorship outside of their alma mater graduate with better employment prospects by nearly 30% (Toyn, n.d.)—career challenges faced by the graduates from Ph.D. Management is enormous and requires a proactive approach toward career development. Recognizing the importance of adaptability and seeking opportunities, considering diverse options would be helpful for the graduates of management courses to find out the complexities of the job market. Hence, ensuring such a smooth transition is only possible after addressing the skills gap, the power enhancement of the professional network, and the well-being of psychological elements (Weese et al., 2022). One of the UNSDGs this study targeted is Sustainable Development Goal 4: Quality Education. Such research focuses on lifelong learning, skill reaping, and adaptability- all aspects that coincide with quality education. The results show how in a Ph.D. Management programs equip learners with critical competencies, such as self-direction, adaptability, and lifelong learning. Such competencies are decisive elements that build proficient professionals for dynamic job markets. Though this research aims to enable people to take charge of their careers proactively and encourage lifelong learning, it is one way toward achieving SDGs by acquiring knowledge and skills to pursue sustainable development, including appropriate technical and professional skills for employment and entrepreneurship.

This study aimed to investigate the career development behavior of PhD management graduates in terms of protean career theory, where self-direction, adaptability, and alignment with personal values are the focus. It sought to establish the most significant factors and competencies that help the graduate independently manage their career, continuously seek new skills, and adapt to changes in the job market. The study aims to understand the graduates' career navigation and their ability to define their careers by examining factors like motivations toward job retention, competencies acquired through the Ph.D. program, and reasons for enrollment.

2. REVIEW OF LITERATURE

The post-doctoral graduates in the management career development process, as described within the protean career development framework, comprise various dimensions explored in the existing literature. This review enumerates significant themes and findings regarding this theme. Hall, in 1976, introduced the concept of Protean Career Development with a focus on self-directed and value-driven career management since this model considers the career development of post-doctoral management graduates across several professional fields.

The studies indicate that post-doctoral management graduates tend to possess traits that go with protean career orientations. These people generally focus on personal values and psychological success rather than the traditional advancement parameters in their careers, which include hierarchical progression within a single organization (Kim et al., 2022). Studies are emphasizing post-doctoral management graduates' adaptability. In her review, Koekemoer (2014) points out that such professionals frequently switch and share academia, industry, and entrepreneurship careers, reflecting the protean nature of career development. Briscoe and Hall, in their research (2006), identified two primary dimensions of the protean career: values-driven and self-directed career management. The post-doctoral graduates in Management have also been reported to score high on both dimensions mentioned above, thus suggesting a close fit with the protean career model (Kim & Hall, 2012).

This research explored whether protean career orientation positively correlates with career satisfaction in the case of post-doctoral management graduates. Cabrera (2009) proved that those applying a protean career development model will likely have a more positive view of career satisfaction. The problems that post-doctoral management graduates face in exercising protean career strategies have also been of particular interest. De Vos and Soens (2008) opined that post-doctoral management graduates must develop self-management skills when they follow a protean career trajectory. It has explored the role of mentoring and networking that fosters protean career development. Higgins and Kram (2001) emphasized the need for multiple developmental networks for those whose careers must be developed in a conventional form. This is true for many graduates from post-doctoral management programs.

Other studies have also focused on the organizational perspective on protean careers. For instance, Lips Wiersma and Hall (2007) identified several ways organizations may enable the protean development of highly skilled experts and post-doctoral management graduates, such as flexible work arrangements and continuous learning. Other researchers revealed that the globalization of careers is one of the influencers of protean career development in post-doctoral management graduates. Stahl et al. (2002) investigated how international experience fuels the growth of adaptable skill sets and global mindsets that form crucial components of protean career success.

Research has identified the long-term impact of protean career orientation on post-doctoral management graduates. Perceived employability and career resilience remained high at follow-up for people who adopted protean career development (Ahmad et al.,2021). Indeed, post-doctoral career development in Management has undergone significant shifts over the last two decades, frequently self-described as Protean Career Development (Fryczyńska & Pleśniak, 2024). This shift captures a more important trend in the modern workforce wherein individuals increasingly assume control of their careers as they react to situational and individual changes (Nishanthi & Kailasapathy, 2018).

The Protean Career Development is self-directed and values-driven career management. To many post-doctoral management graduates, it often fits the bright lights approach since they have graduated possessing advanced skills and diverse experiences (Gulyani & Bhatnagar, 2017). Essentially, these people have devoted many hours and energies to building their academic knowledge; therefore, they will be at that crossroads where academics can only partially meet the shift in their career aspirations
(Lo Presti et al.,2023).

The protean career development is fertile ground in Management due to its dynamic nature and the connections that cut across disciplines (Khan et al., 2016). Post-doctoral graduates in this field often use their research expertise and analytical skills to traverse multiple sectors, such as academia, industry, and entrepreneurial sectors (Wiernik & Kostal, 2019). This versatility enables them to design career paths unique to their individual values and professional objectives, which are hallmarks of the protean career concept (Pernanda et al., 2022, September).

With the lines blurring between the academy and the industry, post-doctoral management graduates are well-placed to realize the promise of developing opportunities. Protean career models require flexibility in skill sets and acceptance of lifelong learning - - precisely what a post-doctoral management graduate brings to the table for a fast-changing job marketplace (Wooten et al., 2014). This is especially important in Management because the continually evolving technology and global economy alter the work environment (De Andrade et al., 2022).

A protean career approach equips those graduates to define their careers as learning cycles rather than linear processes. This approach encourages them to explore, take intelligent risks, and reassess their identity at each stage (Haenggli et al., 2021). For many, it means oscillating between academics, consulting corporate leadership, or even one's entrepreneurial initiatives while maintaining a consistent narrative of individual and professional development (Nazaretsky et al., 2022).

3. METHOD

This paper applied the quantitative research design to discover key variables influencing protean career development among graduates of a Ph.D. in Management. Here, the Principal Component Analysis (PCA) was the primary statistical technique employed for dimensionality reduction of data from the comprehensive career development survey. This research approach helped in understanding the underlying structure of the data and identifying the most influential variables that drive career adaptability and self-direction.

Participants for the study were the Ph.D. Management graduates who volunteered to participate in research based on having completed their programs between 2019 and 2023. They started applying what they learned in their advanced degree in their careers and hence faced significant changes since graduation. The sample comprised ten respondents contacted by email and other professional networks. Participants have professional experience of at least three years since graduation, hence having gained appropriate exposure to the challenges and opportunities of career development. The above sample was selected because it runs in the context of a protean career, in which self-managed career development and adaptability to the newly released labor market needs appear particularly relevant (Montaño & Sobrejuanite, 2024).

The study utilized a structured questionnaire as the primary research instrument. The questionnaire assessed several career dimensions associated with protean career development: goal setting, confidence in change, self-direction, empowerment, and networking. The tool was created based on existing scales derived from previous literature on career adaptability and protean career orientation. The subjects answered items based on their response to statements on these variables using a Likert scale that ranged from 1 (strongly disagree) to 5 (strongly agree).

This survey was carried out in June and August 2024. Adequate time was provided to the respondents to answer the questionnaire. The follow-up emails were also used to get a higher rate of response. The data was collected using an online survey platform accessible to all. This study's most appropriate statistical technique was Principal Component Analysis (PCA). PCA is very suitable for identifying the most significant variables in a large dataset and reducing its dimensionality to make the results easier to interpret (Ha & Lee, 2022), (Abessolo et al., 2017). The study aimed to determine the key factors influencing protean career development among Ph.D. by extracting the principal components that capture the maximum variance in data—management graduates.

These were then analyzed using eigenvalues, and the variance ratio was explained to determine the contribution of each principal component. All components with values more extensive than one are considered significant; factor loading is used to determine the importance of each variable in defining the principal components (Janssen et al., 2018), (Vivo et al., 2016). Explaining these results through the relationships among the variables, like goal setting, self-direction, and networking, helps determine how such factors develop the careers of Ph.D. graduates.

In this study, using PCA, the complexity of career development was broken into a set of manageable and interpretable components that were able to show protean behaviors that contributed the most to the career progression of the graduates. Together with a carefully designed questionnaire, the researchers derived vital insights concerning the self-directed and adaptive career strategies of the Ph.D. Management graduates.

4. RESULT AND DISCUSSIONS

Table 1 shows the why's of staying in a job and the competencies gained through the Ph.D. They use the management (PMD) program and the whys of joining the Ph.D. Management program. When translated within the context of protean career development, these results give a clearer understanding of how Ph.D. Management graduates manage their careers with an emphasis on self-directed learning, adaptability, and personal values.

Table 1.
Techniques Ph.D. Management Graduates Used to Manage Career

Reason for staying in a job	***f***	**percentage**
Lucrative compensation	5	26%
Proximity to residence	3	16%
Career advancement opportunities	3	16%
Meaningful work	6	32%
Family influence	1	5%
Peer influence	1	5%
Total	**19**	**100%**
Competency earned in PMD and used in a job.		
Loyalty	3	4%
Strong Work Ethics	5	7%
Dependability/Reliability/Responsibility	5	7%
Adaptability/Flexibility	6	9%
Self-confidence	6	9%
Self-motivated/Ability to Work with Little or No Supervision	5	7%
Professionalism	5	7%

Honesty/Integrity/Morality	2	3%
Positive Attitude/Energy/Passion	3	4%
Dedication/Hard-work	5	7%
Motivated to Grow and Learn	7	10%
21st Century Skills	7	10%
Community Service Skills	3	4%
Life-long Learning Skills	5	7%
Total	**67**	**100%**
Reason to enroll		
Promotion	3	14%
Competency/Skill Enhancement	8	36%
Meeting Friends	3	14%
Increase in Salary	2	9%
Making Self-Busy	4	18%
Encouragement from Relatives and Friends	2	9%
Total	**22**	**100%**

The Reasons to Stay in a Job data forms a highly heterogeneous set of justifications for Ph.D. Management graduates need to stay with their current jobs, which align with protean career development core concepts—primarily the concept of meaningful work and personal career goals. Most often, graduates stated significant work as a reason for continuing to work in a job (32%), suggesting that graduates' values alignment with intrinsic values is an essential aspect of the protean career model. In protean careers, the individual pursues personal values, autonomy, and a sense of purpose over extrinsic rewards. This implies that many Ph.D. graduates are looking for jobs where work is aligned with personal values rather than financial incentives.

Remunerative compensation remains the significant motivator factor at 26%, ranking number two, which indicates that although financial security is necessary, it is secondary to these candidates who seek proper satisfaction in their chosen careers. Other concerns are thus career advancement opportunities at 16% and proximity to residence at 16%, reflecting that these candidates tactically manage their careers by carefully aligning personal goals with external realities.

Those Skills Acquired from the Doctoral in Management Program and Practiced in the Workplace support the statement that career development is very self-directed. The two most cited competencies are 21st Century Skills and Motivated to Grow and Learn, at 10%. These resonate with the protean career approach of lifelong learning and adaptability, where people seek to continue acquiring new skills that sustain them and enable them to navigate a dynamic career landscape.

According to graduates, Important but infrequent skills were Adaptability/Flexibility and Self-Confidence (9%) in managing protean careers. Adaptability in today's dynamic job market enables pivot and change courses in response to new conditions; self-confidence fosters autonomy necessary for self-directed career growth. Other vital competencies like Dependability, Professionalism, and Work Ethics (all 7-9%) reflect how graduates build reliability and ethical standards in the workplace, whatever careers end.

Interestingly, while Honesty/Integrity/Morality (3%) and Community Service Skills (4%) were named less often, their mention does imply that ethical concerns still hold much importance in protean careers. This again aligns with the adaptable emphasis on maintaining a career direction that reflects one's values so that people behave in ways that reflect their principles.

The Reasons for Enrolling in the Ph.D. Management Program reflects the protean career model orientation toward self-directed career growth and skill enhancement. There is an overrepresentation in the self-reports of those who enrolled because they needed to develop their skills/competence (36%). This heavily indicates that the graduates consider it essential to constantly build their competencies - a feature of a protean career. To this extent, there is an indication that Ph.D. Management graduates are highly motivating forces in developing new skills and competencies that can better their professional capabilities and career trajectories.

Other significant reasons include Keeping Self-Engaged (18%) and Career Advancement (14%). This indicates that people follow such practices for personal growth, career development, and how to spend time productively, which also motivates them. Social reasons such as Taking Friends Along (14%) and Relatives and Friends Encourage (9%) suggest that social networking plays a crucial role in career choices. Again, this aligns with the protean career theory, which suggests active networking and mentoring.

The findings aptly depict the protean career attitude wherein Ph.D. Management graduates take charge of their career planning based on personal values, continuous learning, and adaptability. Meaningful work, adaptability, and self-directed skill enhancement indicate that these graduates now determine their careers according to their goals and aspirations rather than the meager amount of money they can draw.

The attention shown to skills like adaptation, flexibility, and self-confidence provided evidence that students are managing uncertainty and change, two of the significant constituents of the protean career model. These findings also suggest that Ph.D. Management graduates are not only taking themselves through learning. Still, they are also proactively orchestrating and seizing opportunities available to them to work towards alignment with personal values, continued and sustained flexibility, and achievement of new competencies. This fits into the broader patterns of protean career development, where success is not up a predetermined corporate laddering but in personal fulfillment, mastery of skills, and being able to pivot when required.

Table 2 below presents descriptive statistics for critical dimensions of protean career development among Ph.D. Management graduates in the form of their mean responses and standard deviations (S.D.) on 25 relevant critical behaviors of self-directed career management and adaptability. These statistics indicate how graduates lead themselves into career management in changing environments, emphasizing self-reliance, continuous learning, and adaptability, which represent critical attributes of the protean career orientation.

Table 2.
Descriptive Statistics of Protean Career Development

Item	Mean	S.D.	Descriptive Equivalent
Goal-setting	4.90	0.3	Very high
Reassessing goals	5.00	0	Very high
Skill acquisition	5.00	0	Very high
Professional development	5.00	0	Very high
Confidence in change	4.80	0.6	Very high
Strategy evaluation	4.70	0.46	Very high
Exploring opportunities	5.00	0	Very high
Career responsibility	5.00	0	Very high
Market alignment	5.00	0	Very high
Seeking feedback	4.90	0.3	Very high
Empowerment	4.90	0.3	Very high
Adaptability	5.00	0	Very high
Self-direction	4.90	0.3	Very high
Networking	4.90	0.3	Very high
Profile updating	4.10	1.22	Very high
Pursuing challenges	4.70	0.46	Very high
Career pivot	4.90	0.3	Very high
Learning from setbacks	4.90	0.3	Very high
Flexible mindset	4.90	0.3	Very high
Milestone tracking	4.90	0.3	Very high
Mentoring and coaching	4.90	0.3	Very high
Proactive skill development	5.00	0	Very high
Risk-taking	4.90	0.3	Very high

Feedback	4.90	0.3	Very high
Mean	**4.87**	**0.27**	**Very high**

The overall mean score was 4.87, indicating well-developed protean career behavior across most dimensions. The data ranged from 1 to 5. The result signifies that the Ph.D. Management graduates are gifted with powerful protean career attributes, especially in setting personal goals, proactively acquiring new competencies, and maintaining flexible attitudes toward career progression. Graduates tend to proactively set personal career goals and work toward them without outside help, which is one of the protean elements of a mindset. This reflects self-direction and independence in conducting career management - thus, graduate students take charge of their career paths not because they are necessarily controlled by external validation or direction. Questions that addressed aspects of both skill acquisition and professional development drew a maximum mean of 5.00, indicating that respondents find value in lifelong learning and actively seek any required skills to be added to their career portfolios. This is characteristic of the self-directed model for career management, where individuals hold themselves accountable so that their skills remain marketable and competitive in today's marketplace.

The protean career attitude also characterizes adaptability to changing circumstances. Several items in the table above reflect this adaptability: Confidence in Navigating Career Changes (4.80) and Adjusting Career Strategies (4.70). The graduates have the confidence to navigate their career changes and adapt their strategies according to the changing job market conditions. This further infers that they are at ease with uncertainty and can modify their plans to remain aligned with new opportunities or changes in industry trends. Willingness to Pivot (4.90) or change plans for a career if one no longer reflects one's values or interest shows graduates' commitment toward ensuring their career better aligns with personal values and long-term aspirations.

Also representative of the protean career is a proactive orientation toward networking and receiving feedback. The graduates reported that they are highly likely to seek out professional contacts to network (4.90) and to seek input to improve career performance (4.90). These outcomes indicate that these students are involving themselves in developing professional contacts and seeking helpful feedback, two of the principal means through which the creation of career growth and the identification of opportunities can be facilitated.

One activity that showed more variability in comparison was refreshing resumes and updating LinkedIn profiles, which had a lower mean of 4.10 and comparatively higher standard deviation (S.D.=1.22). While most students will refresh their professional profiles, some will only bother a little with this activity. This sizeable standard deviation further ensures that the group shows significant variation in how people consistently prioritize maintaining a professional presence.

Table 2 also depicts that the doctorate graduates welcome taking calculated risks to enhance their careers (Mean = 4.90, S.D. = 0.30) and embrace new challenges in their careers (Mean = 4.70, S.D. = 0.46). These behaviors are very similar to the protean mindset; it shows that graduates will welcome uncertainty and engage in continuous professional development. Protean career development underscores reflection and making sense of experiences. Graduates ranked very high in terms of using setbacks and failures as learning experiences (Mean = 4.90, S.D. = 0.30), so they are resilient enough to turn potential setbacks into learning opportunities. Strong inclinations toward seeking mentoring and coaching (Mean = 4.90, S.D. = 0.30) also reflect their desire to seek guidance and advice to hone career strategies.

In this section are the statistical results obtained from the PCA of the Protean Career Development dataset. This aims to identify those variables contributing to career adaptability, self-direction, and other protean career behaviors.

In Table 3, each component explains the eigenvalues for each principal component (PC) and the variance proportion. Only those components whose eigenvalue was greater than one were counted as significant and captured a significant portion of the data's variance.

Table 3.
Eigenvalues and Explained Variance for Principal Components

Principal Component	Eigenvalue	Variance Explained (%)	Cumulative variance (%)
PC1	9.68	83.99	83.99
PC2	1.67	14.49	98.48
PC3	0.17	1.5	99.98
PC4	0	0	99.98
PC5	0	0	99.98
PC6 to PC18	<0.01	<0.01	100

The results in Table 3 indicate that PC1 and PC2 explain 98.48% of the total variance, where PC1 accounts for most of it, 83.99% means that two components are sufficient to summarize the meaningful data structure.

Table 4 presents the loadings of variables contributing to the first two principal components, PC1 and PC2. Those with high positive loadings are the most critical variables when defining the respective components.

Table 4.
Component Loadings for PC1 and PC2

Variable	PC1	PC2
Goal Setting	0.21	0.54
Confidence in Change	0.3	-0.3
Strategy Evaluation	0.32	-0.21
Seeking Feedback	0.32	0.21
Empowerment	0.32	0.21
Self-Direction	0.32	0.21
Networking	0.32	0.21
Profile Updating	0.26	-0.47
Pursuing Challenges	0.32	-0.21
Learning from Setbacks	0.3	-0.3

Table 4 shows that Goal Setting, Confidence in Change, Strategy Evaluation, Seeking Feedback, Empowerment, and Networking have high loading on PC1, indicating that these are the essential variables defining career adaptability and self-directed career management.

PC1: Variance explained is 83.99%. This factor was primarily characterized by self-direction, empowerment, and flexibility. To the extent that goal setting, seeking feedback, and empowerment are high on the loadings, one can conclude that goal setting, adaptiveness, and feedback-seeking are the protean career behaviors manifested in those who are flexible.

It should be highlighted here that the Profile Updating factor loads negatively on PC2 with a loading of -0.47 and is associated with Goal Setting and Networking. This means that even though Profile Updating may prove indispensable, its role differs from goal-setting and networking processes, which are more immediately related to career adaptability.

As can be gleaned from the PCA results, goal setting, self-direction, and empowerment are the variables that best denote a protean career orientation. Such findings support the argument that individuals who take personal responsibility for their careers by making specific career goals, exhibiting flexibility in the face of change, and effectively using their networks are better positioned to succeed in those environments where continuous career development and flexibility are paramount.

Below in Figure 1 is a scree plot output of PCA, indicating which components should be retained, i.e., which are the most important and thus capture most of the variation in the data. The x-axis is the principal component ordered from 1 to about 17.5, while the y-axis represents the corresponding eigenvalues. The curve shows a typical "elbow" shape: steeply dropping from the first to the second principal component regarding eigenvalue, then tapering off more slowly. In some ways, the first is up at nearly 10, while the second is down at about 2. The eigenvalues fall quickly toward zero past the second component, and the curve drops. It means that most of the variance captured by the data is explained by the first one or two principal components, followed by relatively small contributions from subsequent principal components. Using such a plot, the first one or two principal components for further analysis as they explain the majority of the variance in the dataset.

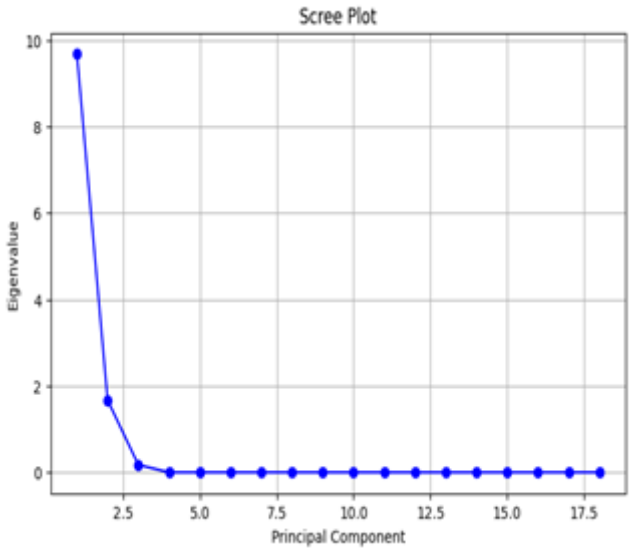

Figure 1.
Scree plot output of PCA

Table 5 further strengthens the case of putting weightage on the first two principal components as it would be already enough to get an excellent understanding of the data with close to 98.48% of the variance explained by PC1 and PC2 itself. Thus, the rest will be insignificant and contribute little to new insights.

Table 5.
Cumulative Variance Explained by Key Principal Components

Number of Components	Cumulative variance Explained (%)
1	83.99
2	98.48

Figure 2 displays the cumulative explained variance as a function of the number of principal components in PCA. In this case, the x-axis represents several components that range between 0 and about 17.5. The y-axis is the cumulative explained variance, lying between 0.84 and 1.00. The curve has a steep initial increase, such that the first component explains approximately 84 percent of the variance. Another massive step with the second component brings the cumulative explained variance to about 98%. After that, the curve shoots up quickly to nearly 100% explained variance with just a handful of components. That kind of rapid convergence suggests that the first two or three components capture the vast majority of the variance in the data, with subsequent components contributing only marginally. Such a plot is commonly used to determine how many principal components to retain in the analysis between explaining most of the variance and keeping the model parsimonious. Here, it would appear that just two or three components would capture almost all the meaningful variation in the data.

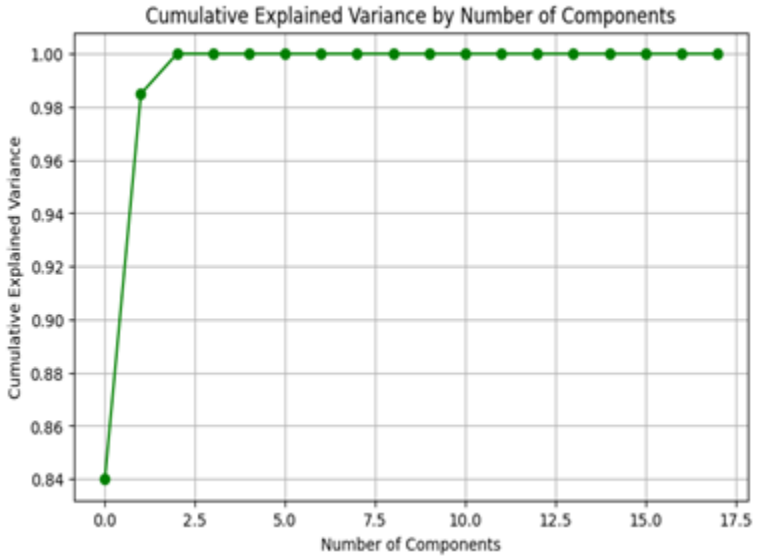

Figure 2.
Cumulative Explained Variance

The career of Ph.D. Management graduates is highly actively depicted as those who accept the principles of protean career development through self-direction, adaptability, and great attention to personal values. The commitment of these graduates toward shaping their career paths into desirable shapes akin to their core beliefs and aspirations is awe-inspiring. Their self-concept of direction propels toward an active, proactive approach toward career management, where a person becomes fully responsible for their own professional improvement or upward mobility.

More importantly, regarding this attribute of adaptability, these graduates are displayed to be more adaptable in the dynamic nature of the work environment to cope and thrive in their areas of activity. They gear themselves up to change and step on to new skills, which makes them agile professionals who can handle changing industries. Their ability to believe in overcoming threats and grasping opportunities in their careers are added as a prime competency by including self-confidence.

The mention of 21st-century skills as widely used competencies portrays the visionary mindset of graduates possessing Management Ph.D. Graduates can handle the challenges of modern workplaces that require a combination of technical understanding, critical thinking, and interpersonal skills by chiseling those competencies. Motivations for such graduates to seek entry into the program reflect deep desires to continue lifelong learning and self-empowerment. Such quests to learn and acquire skills also relate to career advancement, which is part of the protean career model wherein one's personal growth and self-improvement issues are put first and foremost, not the exploitation of simple dollar gains. Such intrinsic drives for continuous self-improvement, hence heightened horizons, indicate deep personal and professional development.

Graduates with a Ph.D. degree in Management are strong and prospective professionals able to interact with contemporary conditions of the labor market. The strategic self-management of their careers based on personal values and development needs puts them as creative agents of change within their spheres of activity. Accepting the doctrine of a protean career puts them in a position within the industry as per trends and tenacity in pursuing professional ambitions.

5. CONCLUSION AND RECOMMENDATIONS

Conclusively, the research findings highlighted that champions of the protean career type were self-directed, continuously learning, and had a values-driven approach to career management. That is an adaptive and proactive way of coping with demands from a professional arena. For most of the items, high mean scores indicate that Ph.D. Management graduates demonstrate protean career behaviors characterized by self-direction, adaptability, and continuous learning. They actually act to proactively manage their careers, take responsibility for their personal development, and adapt appropriately to changing circumstances. The variability in profile updating suggests an area where some of the graduates need further encouragement to maintain their solid professional presence.

In general, it brings out the issue that graduates from a PhD Management course are adequately prepared to deal with the complexities of the career routes of today and make sure that professional development is not only in tandem with personal and professionally aligned values but also with ever-changing requirements of the industry.

Based on the results of this study, recommendations to PhD Management programs should be made to develop further self-directed learning, adaptability, and lifelong skill development to converge with the protean model of careers more effectively. This curriculum should ensure the graduates have 21st Century Skills, self-confidence, and career flexibility to respond to the changing employment environment. Institutions should provide more significant opportunities for professional networking, mentoring, and personalized career coaching toward meaningful career advancement for graduates. Continuous feedback mechanisms and career support services should also be available to help graduates reassess and adjust their career goals to increasingly align with changing industry trends and personal values.

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