

Human Capital in Space Economy: An Integration of Resource-Based View and Resource Dependency Theories

Bora YILDIZ¹ 

¹Associate Professor, Istanbul University, Faculty of Economics, Department of Business Administration, Istanbul, Türkiye

ORCID: B.Y. 0000-0002-0373-6457

ABSTRACT

OECD defines the space economy as “the full range of activities and the use of resources that create value and benefits to human beings in the course of exploring, researching, understanding, managing, and utilising space”. Space economy has emerged as a concept whose importance is increasing day by day for many countries of the world. In recent years, the concept of space economy has particularly started to attract the attention of developing countries who have begun to allocate large budgets for this. One of the most important reasons underlying this is that space technologies accelerate technological developments in direct and indirect industries. The added value of the space economy on other sectors such as technology, production, geography, and medicine is huge. Moreover, progress in the space economy is undoubtedly closely related to human capital. In this context, it is vital for organisations to find, train, and employ innovative, creative, and proactive employees. Accordingly, this study aims to develop a holistic framework for the workforce of the space age by considering the resource-based view and resource dependency theories. This book chapter discusses human capital in the space economy, proactive personality, innovative workplace behaviors, and creativity. Also, various suggestions for businesses are discussed, considering the theoretical frameworks.

Keywords: Creativity, Economy, Human Capital, Innovative behaviours, Proactive personality, Space

Submitted: 29.05.2021 **Accepted:** 12.11.2021

Corresponding author: Bora YILDIZ / borayildiz@istanbul.edu.tr

Citation: Yildiz, B. (2022). Human Capital in Space Economy: An Integration of Resource-Based View and Resource Dependency Theories. In B. E. Balin, V. N. Akun & S. Alis (Eds.), *Proceedings for the First Symposium on Space Economy, Space Law and Space Sciences* (pp. 1-13). <https://doi.org/10.26650/PB/SS46PS01.2022.001.001>

1. Introduction

Humanity’s interest in space and space exploration has been increasing since the earliest periods of history. One of the underlying reasons for this is curiosity, and the second most important reason is the desire to have a command of nature and of issues related to the universe. Developed countries are trying to explore space more and gain a place in space by allocating significant budgets from their economic power. One of the most important reasons for this is that the reflections of discoveries in space have a multiplying effect worldwide. In other words, it can be said that new information obtained from space exploration provides a significant strategic advantage to countries in the economic, social, technological, geographical, military and defence fields. Although developed countries have had an important place in space exploration and the space economy resulting from this, developing countries have also begun to realise these advantages. They have started to find a place in these economies. One of these countries is Turkiye. The establishment of the Turkish Space Agency on 13 December 2018 has been one of Turkiye’s most important steps in this area. The significance of the establishment of this agency can be seen from several aspects: (1) Turkiye’s interest in space, and the fact that Turkiye will allocate a budget for studies in this field, (2) Turkiye’s awareness of the countries that have achieved success in this sense, and (3) Turkiye’s strategies to manage its economic and technological future.

Investments in the space sector have an important place in the budget of states. Vast amounts of space research have led to space exploration investments made mainly by the public (see Figure 1). In other words, space investments have both high costs and huge risks. Therefore, the financial budget allocated by countries for normal infrastructure investment cannot be compared with that allocated for investment in space which is not at the same level due to the high risk involved. As seen in Figure 1, the USA (0.243), Russian Federation (0.179), and Saudi Arabia (0.126) are the G-20 countries that had the highest budgets for space research in 2020, respectively (OECD, 2020). These indicators are also consistent with the economic powers of these countries.

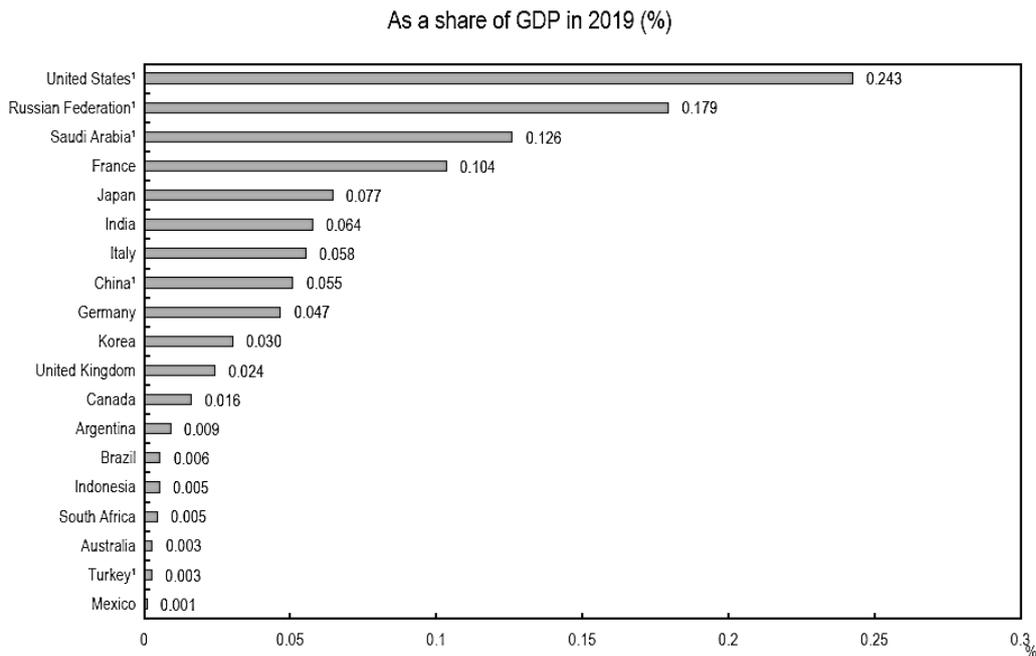


Figure 1. Government space budget estimates for G20 countries (OECD, 2020, p.4)

Companies in the private sector have become fundamental forces on a global scale. The fact that incentives are offered by countries to companies in the private sector has changed space exploration in the sense that research is not only conducted by public companies but also by private sector companies. Another reason for this is that companies in the private sector are aware of space exploration opportunities. In this context, the workforce, management style, leadership types, organisational structures, characteristics, and qualifications that qualified employees must have in private and public organisations are essential determinants of the developments in this sector. In this study, human capital in the space sector will be presented in terms of proactive personality, creativity, and innovative workplace behaviour in the light of the resource-based view and resource dependency theory.

2. Human capital in Space Economy

Human capital is one of the most fundamental resources in the space economy. Human capital is also vital for the effective and efficient use of other resources. According to the OECD's (2012) report on the measurement of space economy, most of the employees in this sector are technicians, engineers, and scientists. Therefore, it is vital to ensure the supply of the labour force working in these professions and meet the demands in this direction. According to the same report, although a definition is made about occupational groups, it is difficult to reach reliable and robust data on the number of employees in the specified occupations. In this context, an attempt was made to ascertain the total number of sector employees based on the number of employees in the sectors directly or indirectly related to the space economy in the countries.

Science is the area most affected by space economics and research (Crawford, 2016). Therefore, the advancement of science can be ensured by employing scientists, engineers, and technicians with the necessary qualifications and characteristics. In this context, employees in science and technology are categorised in seven basic areas: fundamental sciences, engineering and technology, medical sciences, agricultural sciences, social sciences, and humanities and other sciences (OECD, 1995). Patents produced by scientists in these fields have an important place in the progress of space science since innovative and creative human capital is a pioneer in these fields. According to the OECD (2011) report, the world's leading patent holders on space exploration between 2000 and 2008 are as follows: the USA, Europe, Korea, Japan (see Figure 1). Therefore, it can be said that eight countries specialise in space exploration globally, thus providing a significant competitive advantage to these countries over other countries. According to the same report, another important point is that the Russian Federation, France, the USA, and Israel have the most patents related to space exploration. Considering the positions of the leading countries in the space sector globally, the shares of the countries in the space economy are closely related to the number of patents they have produced. In other words, advances in science are closely associated with the number of patents. From the human capital lens, innovative, proactive, and creative employees are needed to produce patents. These concepts and their relations with innovation will be discussed separately below.

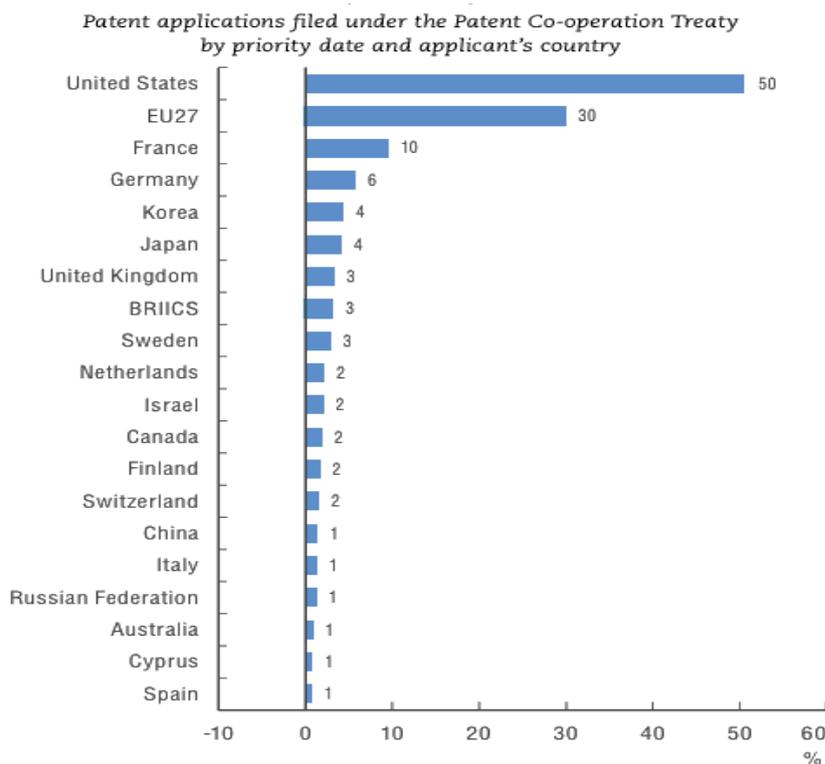


Figure 2. Country share in space-related patents (2000-2008) (OECD, 2011)

2.1. Innovative Workplace Behavior

Innovation has become more critical because of technological development, the globalisation of competition, and the change in human needs. In today’s organisations, the importance of innovation and innovative workplace behaviour is increasing. Innovative workplace behaviour is defined as “an employee’s intentional introduction or application of new ideas, products, processes, and procedures to his or her work role, work unit, or organisation” (Yuan & Woodman, 2010). Innovative workplace behaviour is becoming one of the most important assets of organisations where environmental change is high and where these changes are responded to in a dynamic way (Kanter, 1983; West & Farr, 1990a). In this context, innovative employees, who are rare, scarce, and valuable, are critical for organisations to gain a strategic advantage over their competitors. Finding and inventing new technologies, realising matches, suggesting new ideas to find solutions to problems, learning, and applying new methods are some examples of innovative behaviour (Scott & Bruce, 1998; Yuan et al., 2010).

Scott and Bruce (1994) suggested a conceptual model that visualises potential antecedents of innovative workplace behaviour on three levels, namely leadership (leader-member exchange and leader role expectations), workgroup (team-member exchange), and individual attributes (intuitive problem-solving style and systematic problem-solving style). Also, they emphasised that these antecedents affect innovative workplace behaviour through a psychological climate for innovation (support for innovation and resource supply). They found that support for innovation, leader-member exchange, role expectations, intuitive problem-solving style education, and job type were positively and significantly correlated with innovative workplace behaviour. On the other hand, systematic problem-solving style and career stage had a significantly negative relation with innovative workplace behaviour. As understood from this study, a supportive

climate in the workplace plays a pivotal role in fostering innovative workplace behaviour. Yildiz et al. (2017) found that psychological empowerment and perceived organisational support were positively related to innovative workplace behaviour. Additionally, the quality of the relationship between leader and follower is also an important factor for flourishing innovative workplace behaviour. Supporting this notion, recent studies found that leader-member exchange positively affects innovative workplace behaviour (Schermully et al., 2013; Scott & Bruce, 1998). Also, studies have found that transformational, transactional (Khan et al., 2012), and ambidextrous leadership styles (Usman et al., 2020) were positively associated with innovative workplace behaviour. Further, intuitive problem-solving skills and role expectations are also necessary elements of innovative workplace behaviour.

Past studies found that affective commitment and subjective relational experiences are positively associated with innovative workplace behaviour (Vinarski-Peretz et al., 2011). Affective commitment is one of the sub-dimensions of organisational commitment, defined as “the employee’s emotional attachment to, identification with, and involvement in the organisation” (Meyer & Allen, 1991, p. 67). Subjective relational experiences are categorised under the concept of the high connection in positive psychology discipline that consists of positive regard, mutuality, and vitality (Dutton & Heaphy, 2003). On this basis, one can predict that providing a work environment where employees develop commitment towards their organisation and intend to stay is a positive driver of innovative workplace behaviour. Intrinsic motivation, prior work experience, managerial coaching, and satisfaction with human resources management (HRM) practices in incentive pay systems and training are positively associated with innovative workplace behaviour (Wang, 2013).

According to the ‘The Space Economy at a Glance report’ (OECD, 2011), the space sector is one of the front-runners of innovation and technological developments. Considering the above-mentioned explanations to gain strategic advantage with innovative employees in the space economy, organisations should provide a supportive work environment and climate. Leadership style is also another key factor in bringing out the innovation potential of employees. In this respect, supportive, transformational, and ambidextrous leaders should lead these employees, and organisations should be aware of the importance of this issue. Developing and sustaining good leader-member relations enables employees to develop organisational commitment towards their organisation that, in turn, leads to innovative workplace behaviour (Eisenberger et al., 2010; Taghipour & Dezfuli, 2013).

2.2. Proactive Personality

Some people have the potential to affect their environment or adapt themselves to changes that surround them. Such people can be called proactive people. They are dynamic and shape conditions in their environment (Kuipers et al., 2014). Bateman and Crant (1993) defined proactive personality as a stable disposition toward displaying innovative behaviour. People who have a proactive personality “scan for opportunities, show initiative, take action and persevere until they reach closure by bringing about change” (Bateman and Crant 1993, p.105).

Past studies found that innovative workplace behaviour is strongly associated with proactive personality (Yildiz et al., 2017). Supporting this notion, Seibert et al. (2001) found that proactive personality is one of the positive drivers of innovation. Wang et al. (2017) also stress that

proactive personality is positively associated with work engagement, task performance, and career success potential. Kickul and Gundry (2002) conducted a study on 107 small businesses and found that proactive personality is positively correlated with innovative targeting processes, innovative organisational systems, and prospector strategy. As these studies indicate, proactive personality and innovation are related factors.

Certain leadership styles are also positively associated with proactive personality. For instance, Crant and Bateman (2000) found that charismatic leadership is one such style. The same study also found that extraversion is a personality trait which is positively associated with proactive personality. Buil et al. (2019) found a similar association with transformational leadership. Likewise, Newman et al. (2017) and Song and Lee (2020) found that servant leadership brought about proactive personality. They also emphasised that the quality of the relationship between leader and followers, called leader-member exchange (LMX), is an important factor in revealing the proactive potential of employees.

Proactive personality is also associated with job performance (Bakker et al., 2012; Buil et al., 2019; Crant, 1995). Fuller et al. (2010) found that the effect of proactive personality is higher when autonomy is provided in the work setting. A recent meta-analysis (Fuller & Marler, 2009) synthesised 107 studies and found that proactive personality is positively associated with objective and subjective career success. The study indicated that the overall effect of the relationship between job performance and proactive personality is also positive and significant. The same study also reports that except for agreeableness, four personality traits, namely extraversion, neuroticism, conscientiousness, and openness to experience, are related to proactive personality.

The space sector is one of the most innovative and technology-driven industries. Since technology is changing rapidly, and since competitors quickly learn and solve the strategies of their rivals, proactive employees play a vital role in developing new strategies, ideas, products, and future orientations of technology. In this respect, intuitive skills come to the forefront. Supporting this notion Prieto (2010) linked proactive personality with the entrepreneurial leadership style. The study asserts that proactive individuals are more prone to entrepreneurial leadership. In the light of these explanations, the importance of proactive personality in the recruitment activities carried out by HRM professionals in the space sector and other space-related sectors in Türkiye should be considered. The key players in the Turkish Space Agency are employees with proactive personality traits. A situation of strong leadership and a positive organisational environment will reveal the potential of these people. In this direction, transformational leadership, servant leadership, transactional leadership, and entrepreneurial leadership styles should be considered in organisations within the space sector. Also, organisational support and psychological empowerment (Yildiz et al., 2017) should be provided for these employees to reach their best performances.

2.3. Creative tendency

Another concept that can be associated with the innovativeness of employees is creativity. Creativity is defined as “the production of something that is both new and valued, and madness is defined as a self-destructive deviation in behaviour” (Neihart, 1998: p. 47). Ford and Harris (1992) defined creativity as “a modifiable, deliberate process that exists to some degree in each

person”. Sternberg (2001) defined creativity as “the potential to produce novel ideas that are task-appropriate and high in quality”. The same study asserts that creativity is a way of unusual thinking that is opposite to societal agendas. Kim and Park (2015) stress that the creative self-efficacy of employees is positively associated with innovative workplace behaviour.

Most of the studies in the literature focused on determining the antecedents of creativity. Caniels et al. (2014: p. 96) classified antecedents of organisational creativity as “(1) personality; (2) rewards; (3) the role of co-workers; (4) leadership; and (5) organisational resources”. Dayan et al. (2013) found that intrinsic motivation and creative self-efficacy are significant predictors of entrepreneurial creativity. Tierney and Farmer (2002) found that creative self-efficacy is positively associated with creative performance. They also found that supervisor behaviour and job complexity are significant contributors to the creative efficacy belief. Henker et al. (2015) assert that transformational leadership positively and indirectly affects employee creativity through promotion focus and creative process engagement. Similarly, Muceldili et al. (2013) found that authentic leadership positively affects both creativity and innovativeness. Yang et al. (2017) found that servant leadership has a positive impact on creative self-efficacy. Ethical leadership was also found to be one of the significant drivers of both individual and organisational creativity (Chen & Hou, 2016).

In the literature, numerous studies emphasise the positive correlation between creativity and innovative behaviour. For instance, a recent study found that high-performance work activities such as empowerment, training, rewards, selective staffing, and teamwork are predictors of innovative workplace behaviour (Nasifoglu Elidemir et al., 2020). They also assert that employee creativity has a moderating effect on an organisation’s innovative behaviour and competitive advantage. In other words, creativity and innovative workplace behaviour are significant drivers of sustainable competitive advantage.

A recent meta-analysis on the relationship between creativity and innovation assessed 52 studies and found supportive findings for the individual studies (Sarooghi et al., 2015). They found that the relationship between creativity and innovation is strong, positive, and significant. This finding is especially valid for the individual unit of analysis. In parallel with the space sector, which requires high technological advancements, they also found that the relationship between creativity and innovation is strong in large high-tech organisations. Culture also has a conditional effect on the relation between the two. More specifically, the same study found that the maximum level of the relationship between creativity and innovation is gained in cultures with a moderate uncertainty avoidance level.

As previously mentioned, the space sector is one of the most technology-intensive sectors. In this sector, innovation and creativity are essential components of the industry. These components have a pivotal role in pursuing or gaining a sustainable competitive advantage. As mentioned above, the provision of resources, culture, and suitable leadership styles (e.g., transformational leadership, authentic leadership, servant leadership, entrepreneurial leadership, and ethical leadership) plays a key role in bringing creativity and innovativeness into the open. Since innovation, especially patents, play an essential role in technological advancement, the performance of firms and organisations in the space sector mostly depends on the qualifications and skills of the human capital.

3. Resource-Based View and Resource Dependency Theory in the Space Economy

Although the space industry is a high-tech industry, it can be said that every country in the world has its industries, expertise, and experience. Therefore, while some countries are specialised in this industry, some other countries are in the position of new entrants to the sector. In terms of strategic management discipline, the existence and development of industries can be evaluated from two perspectives. The first of these is the resource-based view, which suggests that organisations should focus on their internal resources and that they can achieve strategic competitive advantage thanks to these resources (Barney, 2001; Wernerfelt, 1984; Barney et al., 2001). Another view is the resource dependency theory, which states that organisations carry certain risks in accessing resources and are dependent on various resources to continue their sustainability (Hillman et al., 2009; Davis & Cobb, 2010).

The resource-based view explains the competitive advantage and survival of firms in terms of internal resources (Barney & Hesterly, 2006; Wernerfelt, 1984). According to this, the rare, valuable, inimitable, and hard-to-substitute resources that organisations have function as core competencies for them (Prahalad et al., 1997). The distribution of these resources among other organisations is heterogeneous and nontransferable (Barney & Hesterley, 2006). Therefore, each organisation can have its core competencies, and with the preservation and development of these capabilities, their competitive powers can continue.

Resources, competencies, and capabilities refer to a firm's strategic assets (Foss & Robertson, 2000). According to Barney (1991), organisations control their effectiveness and efficiency by their knowledge, skills, processes, capabilities. The effective usage of these assets provides a sustainable competitive advantage for the firms. In this respect, organisational resources can be classified as tangible and intangible resources. Accordingly, tangible assets are considered as physical and financial resources (Grant, 1991). Intangible resources are analysed as intellectual capital, referring to the positive difference between book value and market value (Edvinsson & Malone 1997). The concept of intellectual capital also refers to "the sum of all knowledge firms utilise for competitive advantage" (Subramaniam & Youndt, 2005; Nahapiet & Ghoshal, 1998; Youndt et al., 2004). In this respect, human resources play a critical role in the innovation and competitive advantage of the firms (Massingham & Tam, 2015). However, Olander et al. (2015) draw attention to the fact that human resources management is both a strength and weakness of a firm. In other words, if a firm values and appreciates its employees and can use their talents correctly, then these resources are more likely to turn into intellectual capital (strength). However, if companies do not know the value of the resources they have and cannot use these resources and potentials in the right places and times, the rare and valuable knowledge and skills of the employees within the organisation risk being transferred to other organisations (weakness) (Olander et al., 2015). In this context, it is important to provide employees with a supportive organisational climate and to work with leaders who will help employees reveal their talents and abilities, and make them feel valued. In this way talented employees will be retained.

While the resource-based view examines the focus of enterprises on their internal resources, the resource dependence theory focuses on the resources that exist in the external environment (Haleblian et al., 2009). Resource dependency theory considers that businesses need resources in the external environment of firms to survive. These sources are also the focus of other companies. Therefore, having resources means securing the existence of the business, while not having

resources poses a risk for the sustainability of the business (Hilman et al., 2009; Davis & Cobb, 2010; Drees & Heugens, 2013). Starting from the idea that resources are scarce and human needs are endless, which is the main subject of economics (Lipsey et al., 1990), businesses want to take these scarce resources under their control to survive. Therefore, mergers, acquisitions, and strategic alliances can be explained by resource dependency theory (Yin & Shanley, 2008). The advantages of these activities to businesses are explained by Pfeffer (1976: p. 39) as follows: “First, to reduce competition by absorbing an important competitor organisation; second, to manage interdependence with either source of input or purchasers of output by absorbing them; and third, to diversify operations and thereby lessen dependence on the present organisations with which it exchanges.” As understood from these explanations, mergers and acquisitions play a significant role in today’s business world in terms of securing resources and minimising uncertainties.

It is thought that it would be beneficial for Türkiye to evaluate its future activities in the space sector within the framework of the two theories explained above. At this point, the main arguments of both the resource-based view and the resource dependency theory are of high importance. The fact that the human resources employed in the space sector are innovative, proactive, and creative means that these resources are, therefore, core competencies. These core competencies play a critical role in fostering intellectual capital. In this context, it is important to protect and develop these resources and not lose them to competitors. Considering that the number of space sector employees in the world and in Türkiye is quite low, it is clear that the employees in the sector gain even more importance. Thus, planning to help innovative, proactive, and creative employees by working out an effective human resources strategy will eliminate future uncertainties. Another important factor is that the provision of education, resources and positive environmental conditions will reveal and develop the innovative and creative potential of national human resources. Although using only national resources in the space industry creates a sense of security, in terms of scarcity of resources and access to further resources it will be more advantageous to adopt joint ventures and allow for strategic cooperation with other countries. Another benefit of strategic cooperation is that the work done will be of higher quality but at a lower cost. At this point, an important strategy proposal may be cooperation with countries with strong core competencies. Another potential strategy could be that Türkiye supports private sector enterprises in its territory, enabling the establishment of enterprises with different core competencies related to the space sector and leading the establishment of domestic strategic cooperation. Thus, companies in the networks of enterprises in the private sector will be included in the national space sector, and the risk of dependency on resources will be minimised.

4. Conclusion

In summary, it can be said that Türkiye is a new actor in the space sector. Using this situation as an advantage would be beneficial to develop an accurate, effective, and contemporary space economy strategy. In this study, human capital in the space economy and the importance of the employees in the space sector were examined based on the resource-based view and resource dependency theory. In this context, proactive personality, creativity, and innovative workplace behaviours were defined. In addition, the antecedents and consequences of these concepts in the related literature were comprehensively presented. Our study emphasised that human resources constitute the intellectual capital of enterprises. In this context, the human factor is considered as a core competency that is rare, valuable, inimitable, and difficult to substitute. Therefore, it is important to create organisations and strategies in the space sector which take this into account.

Another important point is to create an organisational environment that can reveal the skills of existing talented employees. To achieve this, top managers and HR managers should implement organisational behaviour approaches such as autonomy, supportive organisational climates, psychological empowerment, organisational commitment, and organisational support. Moreover, it is important for managers to understand concepts such as transformational leadership, servant leadership, authentic leadership, ethical leadership, and entrepreneurial leadership and to employ leaders with these characteristics in the space sector. Although creativity and innovation are mostly innate abilities, these abilities can be developed with the right education policies and atmospheres. Therefore, it is important for Turkiye to organise its education system and infrastructure accordingly.

From the point of view of resource dependency theory, it is important for organisational structures to be aware of the scarcity of external resources. In other words, limited resources are desired to be owned by many organisations. In this context, businesses can use strategic collaborations, mergers, and acquisitions as strategies to ensure their sustainability. This study suggests two strategies from resource dependency theory that Turkiye can follow in the space sector. First, Turkiye should focus on its core competencies and build strategic cooperation and partnerships with other countries with different resources. This will enable it to focus, protect, and develop its core competencies and make it easier for strategic partners to access resources by making use of their networks. The second strategy is to create strategic partners for Turkiye by supporting private sector initiatives within the country and increasing access to alternatives to resources by using the networks of these strategic partners. Thus, since there will be more resource providers in the business activities, both sustainability and cost-effectiveness arising from the competition will be ensured.

References

- Bakker, A. B., Tims, M., & Derks, D. (2012). Proactive personality and job performance: The role of job crafting and work engagement. *Human Relations, 65*(10), 1359–1378.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.
- Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management, 27*(6), 643–650.
- Barney, J. B., & Hesterly, W. (2006). *Organisational economics: Understanding the relationship between organisations and economic analysis*. The SAGE handbook of organisation studies, 111-148.
- Barney, J., Wright, M., & Ketchen Jr, D. J. (2001). The resource-based view of the firm: Ten years after 1991. *Journal of Management, 27*(6), 625–641.
- Bateman, T. S., & Crant, J. M. (1993). The proactive component of organisational behavior: A measure and correlates. *Journal of Organizational Behavior, 14*(2), 103–118.
- Buil, I., Martínez, E., & Matute, J. (2019). Transformational leadership and employee performance: The role of identification, engagement, and proactive personality. *International Journal of Hospitality Management, 77*, 64–75.
- Caniëls, M. C., De Stobbeleir, K., & De Clippeleer, I. (2014). The antecedents of creativity revisited: A process perspective. *Creativity and Innovation Management, 23*(2), 96–110.
- Chen, A. S. Y., & Hou, Y. H. (2016). The effects of ethical leadership, voice behavior and climates for innovation on creativity: A moderated mediation examination. *The Leadership Quarterly, 27*(1), 1–13.
- Crant, J. M. (1995). The proactive personality scale and objective job performance among real estate agents. *Journal of Applied Psychology, 80*(4), 532.
- Crant, J. M., & Bateman, T. S. (2000). Charismatic leadership viewed from above: The impact of proactive personality. *Journal of Organizational Behavior, 21*(1), 63–75.
- Crawford, I. A. (2016). The long-term scientific benefits of a space economy. *Space Policy, 37*, 58–61.
- Davis, G. F., & Cobb, J. A. (2010). Resource dependence theory: Past and future. *Stanford's Organization Theory Renaissance, 1970-2000*.

- Dayan, M., Zacca, R., & Di Benedetto, A. (2013). An exploratory study of entrepreneurial creativity: Its antecedents and mediators in the context of UAE firms. *Creativity and Innovation Management*, 22(3), 223–240.
- Drees, J. M., & Heugens, P. P. (2013). Synthesising and extending resource dependence theory: A meta-analysis. *Journal of Management*, 39(6), 1666–1698.
- Dutton, J. E., & Heaphy, E. D. (2003). The power of high-quality connections at work. In K. S. Cameron, J. E. Dutton, & R. E. Quinn (Eds.), *Positive organisational scholarship* (pp. 263–278). San Francisco: Berrett-Koehler Publishers.
- Edvinsson, L., & Malone, M. S. (1997). *Intellectual Capital: Realising your Company's True Value by Finding Its Hidden Brainpower*, HarperCollins Publishers, New York, NY.
- Eisenberger, R., Karagonlar, G., Stinglhamber, F., Neves, P., Becker, T. E., Gonzalez-Morales, M. G., & Steiger-Mueller, M. (2010). Leader–member exchange and affective organisational commitment: The contribution of supervisor's organisational embodiment. *Journal of Applied Psychology*, 95(6), 1085–1103.
- Ford, D. Y., & Harris, J. J. (1992). The elusive definition of creativity. *The Journal of Creative Behavior*, 26(3), 186–198.
- Foss, N. J., & Robertson, P. L. (2000). Introduction: Resources, technology and strategy. In *Resources, Technology and Strategy: Explorations in the resource-based perspective* (pp. 1–10). Routledge.
- Fuller Jr, B., & Marler, L. E. (2009). Change driven by nature: A meta-analytic review of the proactive personality literature. *Journal of Vocational Behavior*, 75(3), 329–345.
- Fuller Jr, J. B., Hester, K., & Cox, S. S. (2010). Proactive personality and job performance: Exploring job autonomy as a moderator. *Journal of Managerial Issues*, 35–51.
- Grant, R. M. (1991). The resource-based theory of competitive advantage: implications for strategy formulation. *California Management Review*, 33(3), 114–135.
- Haleblian, J., Devers, C. E., McNamara, G., Carpenter, M. A., & Davison, R. B. (2009). Taking stock of what we know about mergers and acquisitions: A review and research agenda. *Journal of Management*, 35(3), 469–502.
- Henker, N., Sonnentag, S., & Unger, D. (2015). Transformational leadership and employee creativity: the mediating role of promotion focus and creative process engagement. *Journal of Business and Psychology*, 30(2), 235–247.
- Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource dependence theory: A review. *Journal of Management*, 35(6), 1404–1427.
- Kanter, R. M. (1983). *The change masters*. New York: Simon and Schuster.
- Khan, M. J., Aslam, N., & Riaz, M. N. (2012). Leadership styles as predictors of innovative work behavior. *Pakistan Journal of Social and Clinical Psychology*, 9(2), 17–22.
- Kickul, J., & Gundry, L. (2002). Prospecting for strategic advantage: The proactive entrepreneurial personality and small firm innovation. *Journal of Small Business Management*, 40(2), 85–97.
- Kim, S. J., & Park, M. (2015). Leadership, knowledge sharing, and creativity: the key factors in nurses' innovative behaviors. *JONA: The Journal of Nursing Administration*, 45(12), 615–621.
- Kuipers, B. S., Higgs, M., Kickert, W., Tummers, L., Grandia, J., & Van der Voet, J. (2014). The management of change in public organisations: A literature review. *Public Administration*, 92(1), 1–20.
- Lipsey, R. G., Steiner, P. O., Purvis, D. D., & Courant, P. N. (1990). *Economics*, Harper and Row, New York.
- Massingham, P. R., & Tam, L. (2015). The relationship between human capital, value creation and employee reward. *Journal of Intellectual Capital*, 16(2), 390–418.
- Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualisation of organisational commitment. *Human Resource Management Review*, 1, 61–89.
- Mücellidili, B., Turan, H., & Erdil, O. (2013). The influence of authentic leadership on creativity and innovativeness. *Procedia-Social and Behavioral Sciences*, 99, 673–681.
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organisational advantage. *Academy of Management Review*, 23(2), 242–266.
- Nasifoglu Elidemir, S., Oztüren, A., & Bayıghomog, S. W. (2020). Innovative behaviors, employee creativity, and sustainable competitive advantage: A moderated mediation. *Sustainability*, 12(8), 3295.
- Neihart, M. (1998). Creativity, the arts, and madness. *Roeper Review*, 21(1), 47–50.
- Newman, A., Schwarz, G., Cooper, B., & Sendjaya, S. (2017). How servant leadership influences organisational citizenship behavior: The roles of LMX, empowerment, and proactive personality. *Journal of Business Ethics*, 145(1), 49–62.
- OECD. (1995). *Measurement of Scientific and Technological Activities: Manual on the Measurement of Human Resources Devoted to S&T - Canberra Manual*, The Measurement of Scientific and Technological Activities, OECD Publishing, Paris, <https://doi.org/10.1787/9789264065581-en>.
- OECD. (2011). *The Space Economy at a Glance 2011*, OECD Publishing. <http://dx.doi.org/10.1787/>

- 9789264111790-en
- OECD. (2012). OECD Handbooks on measuring the space economy, OECD Publishing, https://read.oecd-ilibrary.org/economics/oecd-handbook-on-measuring-the-space-economy_9789264169166-en#page4
- OECD. (2020). Measuring the economic impact of the space sector: Key indicators and options to improve data. <https://www.oecd.org/sti/inno/space-forum/measuring-economic-impact-space-sector.pdf>
- Olander, H., Hurmelinna-Laukkanen, P., & Heilmann, P. (2015). Human resources—strength and weakness in protection of intellectual capital. *Journal of Intellectual Capital*, 16(4), 742–762.
- Pfeffer, J. (1976). Beyond management and the worker: The institutional function of management. *Academy of Management Review*, 1(2), 36–46.
- Pralhad, C. K., & Hamel, G. (1997). The core competence of the corporation. In *Strategische Unternehmensplanung/Strategische Unternehmensführung* (pp. 969–987). Physica, Heidelberg.
- Prieto, L. C. (2010). Proactive personality and entrepreneurial leadership: exploring the moderating role of organisational identification and political skill. *Academy of Entrepreneurship Journal*, 16(2), 107.
- Saroghi, H., Libaers, D., & Burkemper, A. (2015). Examining the relationship between creativity and innovation: A meta-analysis of organisational, cultural, and environmental factors. *Journal of Business Venturing*, 30(5), 714–731.
- Schermuly, C. C., Meyer, B., & Dämmer, L. (2013). Leader-member exchange and innovative behavior. *Journal of Personnel Psychology*, 12, 132–142.
- Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3), 580–607.
- Scott, S. G., & Bruce, R. A. (1998). Following the leader in R&D: The joint effect of subordinate problem-solving style and leader-member relations on innovative behavior. *IEEE Transactions on Engineering Management*, 45(1), 3–10.
- Seibert, S. E., Kraimer, M. L., & Crant, J. M. (2001). What do proactive people do? A longitudinal model linking proactive personality and career success. *Personnel Psychology*, 54(4), 845–874.
- Song, C., & Lee, C. H. (2020). The effect of service workers' proactive personality on their psychological withdrawal behaviors: a moderating effect of servant leadership. *Leadership & Organization Development Journal*, 41(5), 653–667.
- Sternberg, R. J. (2001). What is the common thread of creativity? Its dialectical relation to intelligence and wisdom. *American Psychologist*, 56(4), 360–362.
- Subramaniam, M., & Youndt, M. A. (2005). The influence of intellectual capital on the types of innovative capabilities. *Academy of Management journal*, 48(3), 450–463.
- Taghipour, A., & Dezfouli, Z. K. (2013). Innovative behaviors: Mediate mechanism of job attitudes. *Procedia – Social & Behavioral Sciences*, 84, 1617–1621.
- Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal*, 45(6), 1137–1148.
- Usman, M., Ghani, U., Islam, Z. U., Gul, H., & Mahmood, K. (2020). Ambidextrous leadership and innovative work behaviors: workplace thriving as a mediator. *Journal of Public Affairs*, e2321, 1–11.
- Vinarski-Peretz, H., Binyamin, G., & Carmeli, A. (2011). Subjective relational experiences and employee innovative behaviors in the workplace. *Journal of Vocational Behavior*, 78(2), 290–304.
- Wang, Y. L. (2013). R&D employees' innovative behaviors in Taiwan: HRM and managerial coaching as moderators. *Asia Pacific Journal of Human Resources*, 51(4), 491–515.
- Wang, Z., Zhang, J., Thomas, C. L., Yu, J., & Spitzmueller, C. (2017). Explaining benefits of employee proactive personality: The role of engagement, team proactivity composition and perceived organisational support. *Journal of Vocational Behavior*, 101, 90–103.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180.
- West, M. A., & Farr, J. L. (1990). Innovation at work. *Innovation and Creativity at Work: Psychological and Organisational Strategies*. Chichester: John Wiley Sons, Ltd, 309–334.
- Yang, J., Liu, H., & Gu, J. (2017). A multi-level study of servant leadership on creativity: The roles of self-efficacy and power distance. *Leadership & Organization Development Journal*, 38(5), 610–629.
- Yildiz, B., Uzun, S., & Coşkun, S. S. (2017). Drivers of innovative behaviors: The moderator roles of perceived organisational support and psychological empowerment. *International Journal of Organizational Leadership*, 6, 341–360.
- Youndt, M. A., Subramaniam, M., & Snell, S. A. (2004). Intellectual capital profiles: An examination of investments and returns. *Journal of Management Studies*, 41(2), 335–361.
- Yin, X., & Shanley, M. (2008). Industry determinants of the “merger versus alliance” decision. *Academy of Management Review*, 33(2), 473–491.

Yuan, F., & Woodman, R. W. (2010). Innovative behavior in the workplace: The role of performance and image outcome expectations. *Academy of Management Journal*, 53(2), 323–342.

