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MBTI-Personality Types and Traits of Professional Software Engineers

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ABSTRACT

Apprehending the personality types of software engineers is essential for both individuals and organizations, especially in software engineering, which heavily relies on teamwork and soft skills. This paper explores various aspects and dimensions of personality exhibited by software engineers, focusing on Iranian culture. To achieve this, we conducted a comprehensive study that involved analyzing existing research on a global scale and a case study specifically targeting professional software engineers in Iran. The Myers-Briggs Type Indicator test was utilized to gather data, and the responses were carefully filtered, resulting in 102 valid datasets for analysis, representing both the private and public sectors. Our methodology included the development of a comprehensive questionnaire comprised of personal and standardized MBTI questions in Persian. The findings of our study indicate that software engineers in Iran predominantly exhibit a thinking personality rather than a feeling one. Moreover, personality types such as ISTJ, INTJ, ESTJ, and ENTJ were observed to be more prevalent among software engineers, while ISFJ, ISFP, ESFP, ENFP, and ESFJ were less common. While these results align with global trends, there are also noteworthy distinctions among Iranian software engineers. The implications of our research extend to practical applications for managers, human resources specialists, and recruiters. By understanding software engineers' personality types and traits, employers can optimize talent acquisition strategies, improve job placements, and tailor career development programs accordingly. This knowledge is helpful for students and those interested in a career in software engineering. It aids in making informed decisions that meet the field's requirements.

Keywords*— *Behavioral Data Analysis, Human Factors in Software Engineering, Empirical Software Engineering, Human Resources, MBTI.

1. Introduction

In today's fast-paced world, finding a job that aligns with one's personality is essential. Similarly, organizations strive to identify the most suitable candidates efficiently and accurately. Psychological personality tests offer a promising avenue to address these challenges. However, it is necessary to recognize that pigeonholing individuals into specific roles based solely on dominant traits might not yield optimal outcomes. By delving deeper into personality types and influential factors within the software industry, we can gain invaluable insights into optimizing team dynamics, collaboration, and productivity.

Understanding personality types holds importance for individuals and organizational managers. For individuals, gaining a deep understanding of their personality type can lead to self-awareness and personal growth. Individuals can make informed decisions about career paths, work environments, and interpersonal interactions by recognizing their strengths, weaknesses, and preferences. This self-awareness can increase job satisfaction, productivity, and well-being [1]. Additionally, understanding the personality types of colleagues and team members allows individuals to tailor their communication and collaboration strategies accordingly, fostering more effective teamwork and reducing conflicts.

For organizational managers, comprehending personality types is required for building strong and cohesive teams. By understanding the diverse range of personalities within their workforce, managers can leverage individual strengths and assign tasks that align with employees' natural inclinations. This enhances employee engagement and job satisfaction and maximizes productivity and efficiency [2]. Furthermore, being aware of potential clashes between different personality types can help managers proactively address conflicts and create a harmonious work environment [3]. By nurturing a culture that values and respects individual differences, organizations can make a positive and inclusive workplace, ultimately attracting and retaining top talent [4].

Human resource managers are pivotal in leveraging MBTI personality types to enhance recruitment, selection, and employee development processes [5]. By incorporating MBTI assessments into hiring procedures, human resource managers can gain insights into candidates' preferred work styles, problem-solving approaches, and interpersonal dynamics. This knowledge enables them to make more informed decisions when matching candidates with specific roles and teams, increasing the likelihood of successful hires. Similarly, using MBTI as a tool for professional development helps human resource managers identify training and growth opportunities that align with employees' personality traits, promoting continuous learning and career advancement [6]. Ultimately,

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by harnessing the power of MBTI, human resource managers can create a more effective and efficient workforce, leading to improved organizational performance and reduced costs [6].

The Myers-Briggs Type Indicator (MBTI) sheds light on how personality type manifests from birth [7]; yet remains susceptible to environmental influences and learning [8]. Moreover, the dynamic nature of the MBTI highlights that undesirable traits can be transformed through practice and self-awareness [8]. As software engineering has evolved significantly, technical proficiency alone has become inadequate for success. Today, software engineers must possess a unique blend of personal qualities and interpersonal skills alongside their coding prowess and computer science acumen. These indispensable attributes include effective communication, problem-solving capabilities, adaptability to change, leadership qualities, and teamwork abilities [9]. The fusion of technical expertise with these vital personal qualities has emerged as a cornerstone for thriving careers in software engineering.

This study uses personality tests and questionnaires to identify the prevalent personality types within the software industry. Our research aimed:

- To uncover the dominant personality types and influential factors among professionals in this field.
- To investigate the unique personality typologies of software engineers in Iran while considering cultural influences [8-10].
- To differentiate our research approach by studying professional software engineers instead of relying on student samples, as commonly done in previous studies [2].

2. Literature review

This section provides an overview of the MBTI test and its application in personality assessment studies. It discusses the four-letter system that categorizes individuals into sixteen distinct personality groups. The section also introduces the Keirsey Temperament Sorter as a complementary tool. Furthermore, it highlights a fundamental table for global search and our research in Iran. Also, we introduced some previous works conducted after 1975 with real-world work experience, emphasizing the relevance of roles and practical application.

2.1. MBTI

The MBTI, derived from Carl Jung's Personality types [11-12], is a widely recognized test that categorizes individuals into sixteen personality groups based on four letters: E/I, S/N, T/F, and J/P. These letters represent Extraversion/Introversion, Sensing/Intuition, Thinking/Feeling, and Judging/Perceiving, respectively. For example, someone with extraversion, sensing, thinking, and judging traits would be classified as ESTJ.

The exploration of personality through the MBTI is fascinating, offering diverse interpretations and insight into the unique characteristics of each personality type. The Keirsey Temperament Sorter (KTS) complements the MBTI by defining four temperaments [13]:

- The Guardians (-S-J), who are logistical
- The Artisans (-S-P), who are tactical
- The Idealists (-NF-), who are diplomatic
- The Rationales (-NT-), who are strategic

To establish a statistical benchmark, we refer to the average outcomes of the MBTI in the United States, which serves as a representative measure for previous studies [14-15]. Also, we represented the MBTI average results of Iranian people. This data was collected via an online questionnaire over three years, and 62,519 Iranian People were Involved [16]. The average percentage for each type can be seen in Table 1, and each letter is illustrated in Table 2.

2.2. Previous studies

Various studies have utilized MBTI with different settings and item numbers. While some have categorized software engineering according to positions, the levels of individuals involved were often overlooked, potentially yielding different outcomes. In Table 3, personality percentages were shown, separated by roles. Moreover, In Table 4, we inferred other factors, but inconsistency can be seen in total percentages for some of the studies due to their rounding operations.

For this study, we only review studies that were published after 1975 and have 45 participants or more. One of our main factors in choosing was that the sample had a role or some real work experience. Also, it has been tried to avoid pure student, educational studies, and studies that do not have roles as much

Table 1. The MBTI sixteen personality type results

Type	*United States*	*Iran*
ISTJ	11.6	5.13
ISFJ	13.8	4.8
INFJ	1.5	5.29
INTJ	2.1	6.49
ISTP	5.4	2.74
ISFP	8.8	3.88
INFP	4.4	8.28
INTP	3.3	8.38
ESTP	4.3	3.84
ESFP	8.5	4.78
ENFP	8.1	9.25
ENTP	3.2	7.22
ESTJ	8.7	8.24
ESFJ	12.3	8.65
ENFJ	2.5	6.42
ENTJ	1.8	6.56

Table 2. The MBTI eight letters' personality results

Type	*United States*	*Iran*
E	49.3	52.8
I	50.7	47.2
S	73.3	46.47
N	26.7	53.53
T	40.2	51.03
F	59.8	48.97
J	54.1	51.43
P	45.9	48.57

Table 3. Other and our studies percent for MBTI's 16 personalities

Study	Role	ISTJ	ISFJ	INFJ	INTJ	ISTP	ISFP	INFP	INTP	ESTP	ESFP	ENFP	ENTP	ESTJ	ESFJ	ENFJ	ENTJ
[17]	*Software Engineer	10	7	1	6	5	2	1	5	15	6	3	2	25	2	3	7
[18]	*Software Engineer	17.3	3.6	2.2	9	8.1	1.6	3.9	11.5	4.7	2	3.8	9.7	12.7	2.1	2	6
	*System Analysts	17.7	4.8	2	6.7	5.7	3	4.3	7.1	5.6	2.3	4.8	7.1	14.1	4.7	2.2	7.9
	*Developer	19.4	5	2.6	7.6	9.1	3.3	5.4	9.1	5	2.1	4.4	5.4	4.5	4.5	1.3	5.9
[19]	*Developer	21.1	5.5	0.8	3.9	3.1	6.3	7	7	5.5	5.5	5.5	3.1	14.8	5.5	2.3	3.1
[20]	*Software Engineer	19.5	3.3	3	10.1	8.2	2.9	4.3	9.9	5.4	2.4	3.6	6.8	10.9	2.5	2.3	5
[21]	*Developer	10.16	5.08	6.77	6.77	8.47	6.77	6.77	10.16	0	3.39	3.39	6.77	8.47	3.39	6.77	5.77
[22]	*Scientific Computer Professionals	19.2	4.3	8.5	12.8	8.5	0.0	6.4	14.9	2.1	6.4	4.3	0.0	6.4	0.0	2.1	4.3
Our Study	*Computer Engineer	19.61	2.94	3.92	14.70	7.84	2.94	2.94	14.70	3.92	1.96	0.98	3.92	11.76	0.98	0	6.86
		19.48	2.6	1.3	12.99	7.79	2.6	0	14.29	5.19	2.6	1.3	5.2	14.29	1.3	0	9.09
		20	4	12	20	8	4	12	16	0	0	0	0	4	0	0	0
	*Software Engineer	19.78	3.3	3.3	13.19	7.69	3.3	3.3	14.29	4.4	2.2	1.1	4.4	13.19	0	0	6.6
	*Developer	20.83	2.78	4.17	12.5	8.33	4.17	0	13.89	5.56	2.78	1.39	4.17	15.28	0	0	4.17
	Strong	13.89	5.56	2.78	16.67	2.78	2.78	0	19.44	5. 56	0	0	2.78	19.44	0	0	8.33
	Average	20.41	2.04	6.12	14.28	10.20	4.08	4.08	12.24	2.04	0	2.04	6.12	8.16	2.04	0	6.12
	Weak	29.41	0	0	11.76	11.76	0	5.88	11.76	5.88	11.76	0	0	5.88	0	0	5.88
	Highly Satisfied	23.53	0	1.96	17.65	3.92	1.96	1.96	7.84	3.92	1.96	0	5.88	17.65	1.96	0	9.80
	No/Moderate Satisfied	15.69	5.88	5.88	11.76	11.76	3.92	3.92	21.57	3.92	1.96	1.96	1.96	5.88	0	0	3.92

** Studies included in our voting system.*
The cells that are colored green indicate the presence of a statistically significant difference in a positive way, and the cells that are colored red indicate the presence of a statistically significant difference in a negative way.

Table 4. Other and our studies percent for MBTI's eight letters and their KTS

Study	Role	E	I	S	N	T	F	J	P	SJ	SP	NT	NF	Country	Gender	Count
[17]	*Software Engineer	63	37	72	28	75	25	61	39	44	28	20	8	Cuba	M/F	100
[18]	*Software Engineer	42.8	57.2	52	48	78.9	21.1	54.8	45.2	35.7	16.4	24.6	23.5	Multi Cultural	M/F	1326
	*System Analysts	48.7	51.3	57.9	42.1	71.9	28.1	60.1	39.9	41.3	17.6	20.3	21.8			2493
	*Developer	38.5	61.5	58.3	41.7	71.4	28.6	56.2	43.8	33.4	19.5	19.7	22			1719
[19]	*Developer	45.3	54.7	67.3	32.7	60.8	39.2	57	43	46.9	20.4	16.3	16.4	USA	M/F	128
[20]	*Software Engineer	38.9	61.2	55.1	45	67.5	32.6	56.6	43.5	36.2	18.9	23.3	21.5	Canada	M/F	1252
[21]	*Developer	38	61	45.73	53.17	54.18	44.72	45.72	53.18	27.1	18.63	27.08	26.09	USA	M/F	59
[22]	*Scientific Computer Professionals	25.6	74.6	46.9	53.3	68.2	32	57.6	42.6	29.9	17	53.3	21.3	USA	M/F	47
Our Study	*Computer Engineer	30.39	69.61	51.96	48.04	83.33	16.67	60.78	39.22	41.18	28.43	40.2	7.84	Iran	M/F	102
		38.96	61.04	55.84	44.16	88.31	11.69	61.04	38.96	36.36	24.68	41.56	2.6		M	77
		4	96	40	60	68	32	60	40	56	40	36	24		F	25
	*Software Engineer	31.87	68.13	53.85	46.15	83.52	16.48	59.34	40.66	39.56	28.57	38.46	7.69		M/F	91
	*Developer	33.33	66.67	59.72	40.28	84.72	15.28	59.72	40.28	40.28	26.39	34.72	5.56		M/F	72
	Strong	36.1	63.9	50	50	88.89	11.11	66.67	33.33	38.89	25	47.22	2.78		M/F	36
	Average	26.53	73.47	48.98	51.02	79.6	20.41	59.18	40.82	42.86	30.61	38.78	12.24		M/F	49
	Weak	29.41	70.58	64.71	35.29	82.35	17.64	52.94	47.06	41.18	29.41	29.41	5.88		M/F	17
	Highly Satisfied	41.18	58.82	54.90	45.10	90.20	9.80	72.55	27.45	43.14	15.69	41.18	3.92		M/F	51
	No/Moderate Satisfied	19.60	80.39	49.02	50.98	76.47	23.53	49.02	50.98	39.22	41.18	39.21	11.76		M/F	51

** Studies included in our voting system.*
The cells that are colored green indicate the presence of a statistically significant difference in a positive way, and the cells that are colored red indicate the presence of a statistically significant difference in a negative way.

as possible. Studies with only students are not practical for us because many of these students are not working in that field in the future or might not be keen on that field.

3. Methodology

Our research analyzed existing works, as outlined in previous sections. Additionally, we conducted a case study on a group of Iranian software engineers. To do this, we designed a test using Google Forms, consisting of eight personal questions and 87 standard MBTI questions in Persian. Our participants were professionals working in real companies across Iran's private and public sectors. These software engineers came from various organizations, including Golrang System, Iran Khodro (Sapco, Iseikco, Iran Khodro Diesel, Samand Trabar, Samand Raill), and other companies. We sent the test to individuals, and after filtering out any corrupted or random responses, we received 102 valid responses. The personal questions were:

- What is the highest educational degree you have achieved in computer science?
- Have you ever changed your field of study from or to the computer field?
- What is your current role in the company?
- How long have you been working professionally in the computer field?
- What is the name of your current company?
- How passionate are you about working in the computer field?
- How satisfied are you with your career in the computer field?
- What is your proficiency level in the computer role you are currently working in? (The final result is a combination of expert opinion and self-assessment.)

We initially examined the sample demographics from various perspectives to better understand our data. For this purpose, Table 5 displays the educational degrees of individuals categorized by gender.

Table 6 provides a comprehensive view of individuals' years of experience and job responsibilities. It is worth noting that some individuals hold multiple positions, which accounts for the total number of positions being more than 102.

Combining the responses with expert evaluations determined that 17 individuals are considered weak, 49 ordinary, and 36 strong. Additionally, based on their responses, four individuals reported low satisfaction, 47 reported moderate satisfaction, and 51 reported high satisfaction.

In the next section, we will compare the results of our case study with other research using basic tables via IBM SPSS software. Then, a one-sample t-test was conducted to determine whether significant differences existed.

4. Result and findings

In this section, we analyze previous studies that utilized the MBTI. Also, we examine the MBTI profile of Iranian computer engineers, software engineers, and developers. The findings of this section can provide valuable insights into the MBTI profiles of software engineers and computer professionals.

Table 5. Computer degree and gender population

Gender	*Ph.D.*	*Master*	*Bachelor*	*Associate*	*Diploma*	*No*	*Total*
Male	3	26	40	2	0	6	77
Female	1	12	9	1	1	1	25
Total	4	38	49	3	1	7	102

Table 6. Years of work based on roles

Role	*<=3*	*>3 & <=10*	*>10 & <=30*	*Total*
Developer	12	36	24	72
Analyzer	1	9	7	17
Tester	2	4	0	6
Support	3	6	1	10
Network/Security/Hardware	1	11	5	17
Computer Engineer (Total)	19	66	37	122

4.1. Analyzing other works which used the MBTI

In this part, we extract some roles from mentioned tables in previous sections. Our basic personality table (Tables 1 and 2) is derived from US MBTI personality statistics. While this approach is not exact for non-US studies, it provides a general idea of the trend. Figure 1 displays studies from Table 3 that reveal the personality traits of software engineers in various roles, with the US average personality depicted in blue. The other personalities were combined for simplicity as the trends are the focus, and separating them is insignificant and represented by red color columns. There is a notable discrepancy in typing habits between the general American population and computer engineers, as represented by a yellow bar. The height of the yellow column indicates the extent of difference in the percentage of people who type, with negative values indicating a higher prevalence among computer and software engineers than the general population. ISTJ is the personality type more prevalent among computer engineers than the US average in many of these studies, with a considerable difference. In most studies, INTJ, INTP, ENTP, ESTJ, and ENTJ are also higher than average. In contrast, ISFJ, ESFJ, ISFP, ESFP, and ENFP are predominantly or entirely below average in the way that can be detected obviously.

In Figure 2, we have studies of Table 3, which was personality letters of software engineers, and the US average personality in blue. Thinking (T) and Intuitive (N) people are higher than average in these studies. Also, Introvert (I) and Judging (J) people are higher in most cases. Feeling (F), Sensing (S), Extravert (E), and Perceiving (P) people are average or below average in most cases.

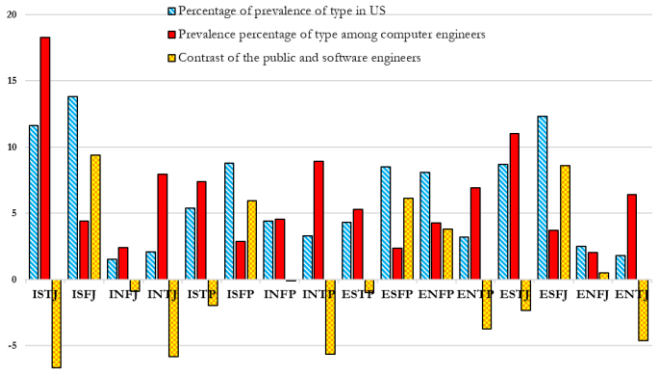

Figure. 1. Compeering the 16 personality types results from previous works and the US average

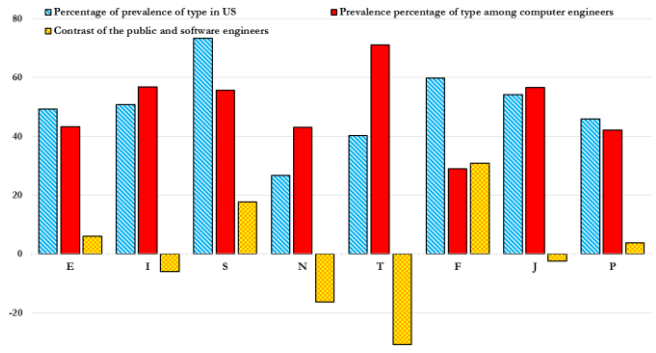

Figure. 2. Compeering the eight personality letters result from previous works and the US average

To provide a clearer comprehension of the contrast between software engineers and the general public, as illustrated in Figure 2, an easier-to-compare spider diagram is presented in Figure 3. This diagram highlights the eight personality traits constituting the MBTI, enabling a more straightforward comparison between the two groups.

In Figures 4 and 5, we have studies of Table 3, which is the KTS of software engineers and the US average personality in blue. Rational (NT) and Idealists (NF) were higher than average in most studies. In contrast, Artisan (SP) and Guardians (SJ) were below average.

To ensure that our analysis is rigorous and reliable, it is necessary to ascertain whether any observed differences are statistically significant. To accomplish this, we employed the one-sample t-test, a widely accepted method for determining whether a sample mean differs significantly from a population mean. To interpret the data presented in Table 3 and Table 4, we rely on a voting system where a majority of over fifty percent determines the win condition, and we deduce the following insights:

- being T or not being F (100%)
- not being ESFJ (87.5%)
- not being ISFJ (75%)
- being N or not being S (62.5%)
- not being SJ (62.5%)
- being ISTJ (62.5%)
- being INTJ (62.5%)
- not being ISFP (62.5%)
- not being ESFP (62.5%)
- not being ENFP (62.5%)
- being ESTJ (62.5%)
- being ENTJ (62.5%)

And border results:

- being I or not being E (50%)
- not being SP (50%)
- being NF (50%)
- being INTP (50%)
- being ENTP (50%)

4.2. Analyzing the Iranian computer engineers' MBTI profile

Tables 3 and 4 show the MBTI personality type percentages for all groups with over 25 members (excluding the weak group), including computer engineers (all roles), software engineers (all positions except network and security and hardware), and developers. The personality type percentages are also categorized based on the level of strength. Furthermore, M represents Male, F represents Female, and M/F represents all individuals in these tables: results and findings.

Figure 6 shows the bar chart of MBTI personality types of Iranian software engineers versus Iran's average results for visual comparison. ISTJ, INTJ, INTP, ISTP, and ESTJ have a considerable positive difference from the norm. In contrast, ESFJ, ENFP, ENFJ, and INFP differ negatively from the norms.

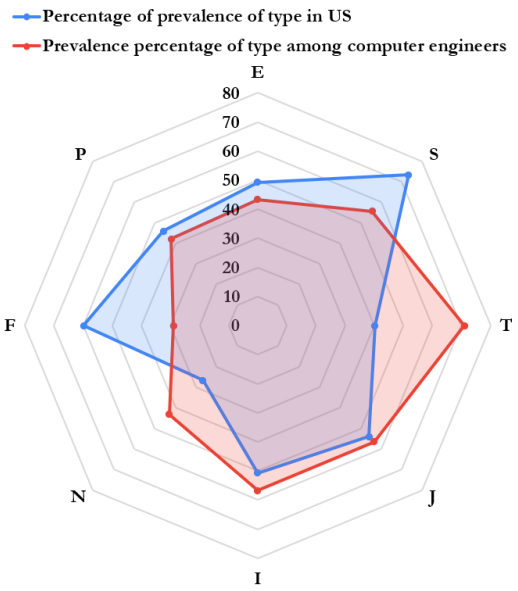

Figure. 3. Compeering the eight personality letters result from previous work and the US average in the spider chart

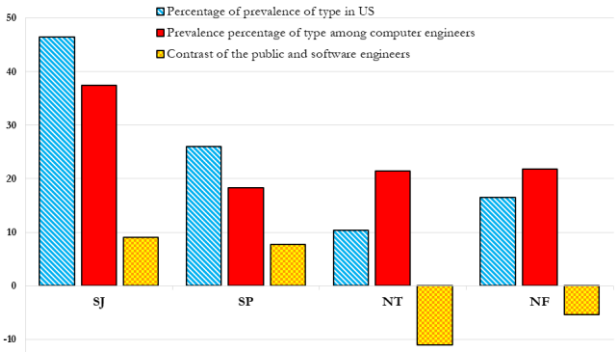

Figure. 4. Compeering the KTS results from previous works and the US average

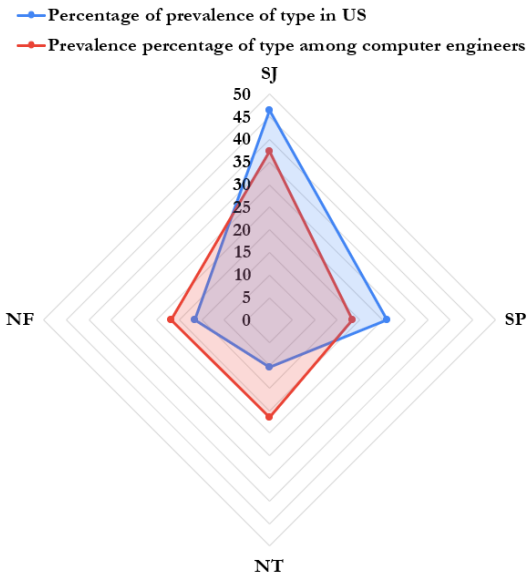

Figure. 5. Compeering the KTS results from previous work and the US average in the spider chart

Figure 7 and Figure 8 show the MBTI eight personality letters of software engineers versus Iran's fundamental table values. Introverts and Thinking are apparently more than norms, and their complementary letters are less than norms.

In order to offer a more transparent understanding of the discrepancy between the software engineers involved in our research and the overall population in Iran, we have provided a more simplified spider diagram in Figure 8 for comparison purposes.

Figure 9 and Figure 10 display bar chart and spider chart of the KTS personality results of software engineers versus Iran's average results. Guardians (SJ) and Rational (NT) are noticeably above the norm, and Idealists (NF) are below it.

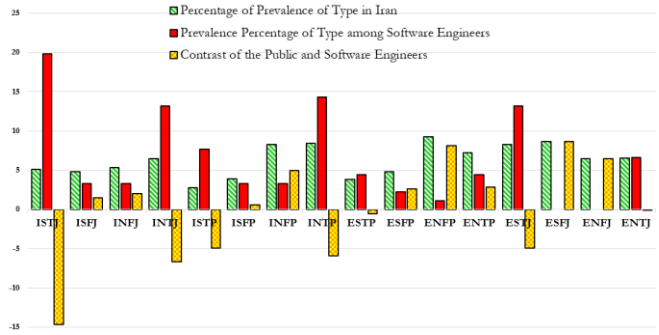

Figure. 6. The sixteen personality types results from our case study and the Iran average

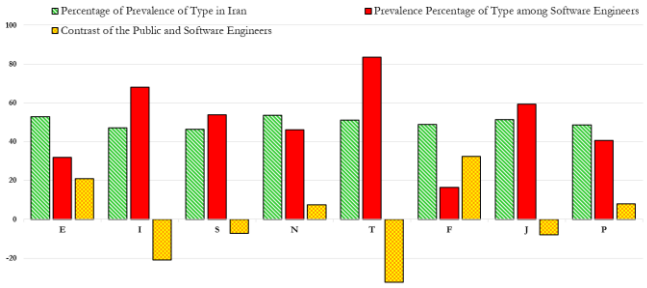

Figure. 7. The eight personality letters result from our case study and the Iran average

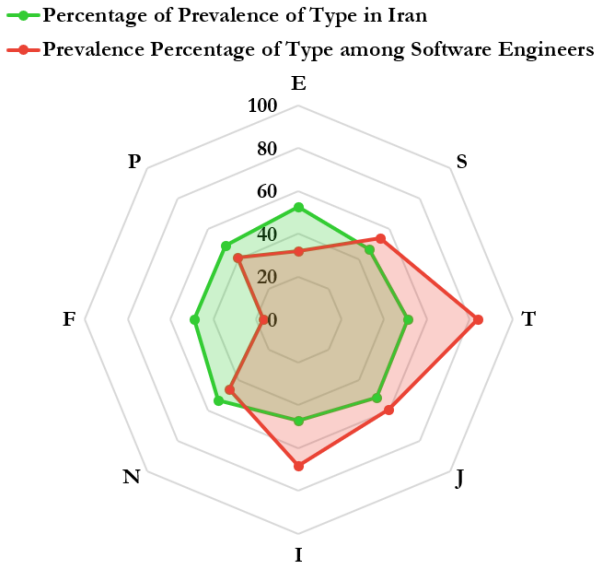

Figure. 8. The eight personality letters result from our case study and the Iran average in the Spider chart

5. Limitations and Future Works

One important consideration is the limitation of our sample size and the need to encourage greater participation in the study. By increasing the sample size, we can obtain more precise results and conduct in-depth analyses of gender and role differences [23-26]. Females are believed to be more extroverted [27]. Our research found that female computer engineers tend to be more introverted than the general population, which is a common observation in larger sample sizes. This interesting discovery highlights the need for further investigation and exploration in future studies.

Additionally, we acknowledge that the current interview protocol used in this research consisted of over 95 items, requiring more than ten minutes to complete, which may have led to examiner fatigue. To address this issue, we propose implementing gamification techniques or offering appropriate incentives to enhance participant engagement.

Another important aspect to be mindful of is the potential for response bias in self-reporting tests, wherein individuals may consciously select what they perceive as more favorable answers. Computer engineers and psychologists need to find new and improved interview methods that eliminate the self-reporting component for more precise results. Finally, it is beneficial to investigate is researching about the effects and personality changes that occur in samples who start to learn computer fields and after some years of studying the lessons (like the Algorithm, Logical circuits, et cetera), solving

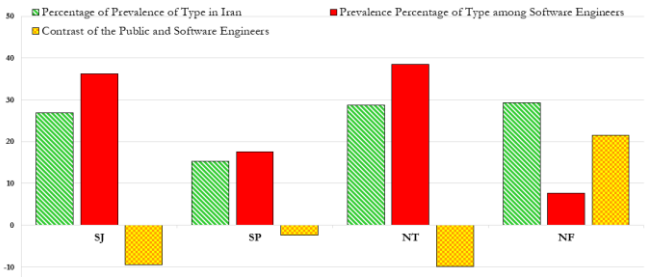

Figure. 9. The KTS results from our case study and the Iran average

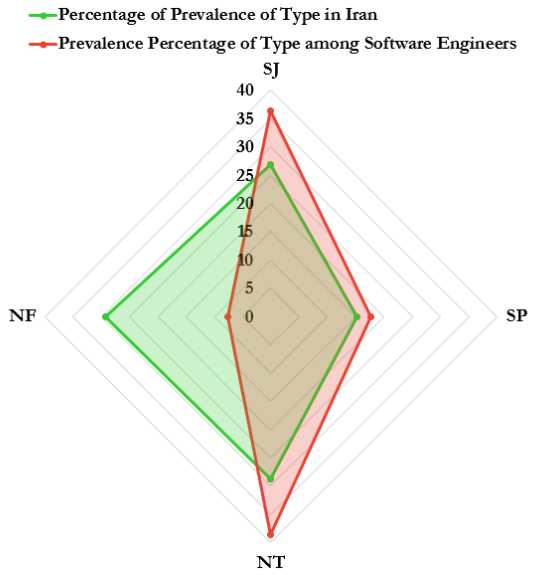

Figure. 10. The KTS results of our case study and the Iran average in the spider chart

computer problems, and working experience can be knowledge acquiring.

The findings presented in this paper, combined with our previous work, hold significant promise for practical applications such as job recruitment and the detection of behavioral disorders in the future [28]. We can leverage these insights to tackle real-world challenges more effectively by addressing the abovementioned limitations and conducting further research.

6. Conclusions

In today's job market, finding a role that aligns with one's personality is crucial. Psychological personality tests can aid in this process. Understanding the multifaceted nature of personality and its influence in the software industry can provide valuable insights for optimizing team dynamics, collaboration, and productivity. Software engineers now require a balance of technical expertise and essential interpersonal skills to succeed in their careers. This research can help managers, human resource specialists, recruiters, and individuals in software engineering by informing talent acquisition strategies, job placements, career development programs, and guiding career decisions.

This study aimed to address the limitations of previous research on the personality traits of software engineers, which predominantly focused on computer engineering students as the sample. By conducting interviews with professional software engineers actively involved in the field, we sought to provide a more accurate understanding of their personality profiles.

Our initial step involved comparing the fundamental table with previous studies through a one-sample t-test to determine statistically significant differences. We discovered distinct patterns among software engineers in analyzing the data using the MBTI framework. Specifically, they exhibited higher levels of ISTJ, INTJ, ESTJ, and ENTJ personalities, while displaying lower levels of ISFJ, ISFP, ESFP, ENFP, and ESFJ traits. Furthermore, our analysis revealed a prevalence of Thinking (T) and Intuition (N) preferences among software engineers, coupled with reduced Sensing (S) and Judging (J) characteristics.

To validate our results, we conducted a case study involving 102 professional Iranian computer engineers from the public and private sectors. These individuals took the MBTI test, and their scores were compared with the average results of Iranian participants. Remarkably, our findings roughly aligned with earlier research. We observed positive differences in the distribution of ISTJ, I, T, SJ, and SP types among software engineers, while noting negative variances in INFP, ENFP, ESFJ, E, F, and NF categories. Notably, all these variations were statistically significant for the software engineering profession.

Declarations

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Authors' contributions

SE: Gathering data, Analyzing Data, Writing Paper;

AV: Analyzing Data and Visualization, Rewriting Paper

FT: Supervising and checking validity.

Conflict of interest

The authors declare that no conflicts of interest exist.

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References

[1] M. Yilmaz, R. V. O'Connor, R. Colomo-Palacios, and P. Clarke, "An examination of personality traits and how they impact on software development teams," *Information and Software Technology*, vol. 86, pp. 101–122, Jun. 2017. https://doi.org/10.1016/j.infsof.2017.01.005.

[2] A. B. Soomro, N. Salleh, E. Mendes, J. Grundy, G. Burch, and A. Nordin, "The effect of software engineers' personality traits on team climate and performance: A Systematic Literature Review," *Information and Software Technology*, vol. 73, pp. 52–65, May 2016. https://doi.org/10.1016/j.infsof.2016.01.006.

[3] V. GAROUSI and A. TARHAN, "Investigating the Impact of Team Formation by Introversion/Extraversion in Software Projects," *Balkan Journal of Electrical and Computer Engineering*, pp. 64–73, Apr. 2018. https://doi.org/10.17694/bajece.419645.

[4] A. R. Gilal, J. Jaafar, M. Omar, S. Basri, and A. Waqas, "A rule-based model for software development team composition: Team leader role with personality types and gender classification," *Information and Software Technology*, vol. 74, pp. 105–113, Jun. 2016. https://doi.org/10.1016/j.infsof.2016.02.007.

[5] M. A. Iqbal, F. A. Ammar, A. R. Aldaihani, T. K. U. Khan, and A. Shah, "Predicting Most Effective Software Development Teams by Mapping MBTI Personality Traits with Software Lifecycle Activities," In *2019 IEEE 6th International Conference on Engineering Technologies and Applied Sciences (ICETAS)*, IEEE Xplore, Dec. 01, 2019, pp. 1-5. https://ieeexplore.ieee.org/abstract/document/9117370 (accessed Jun. 24, 2020).

[6] A. S. Barroso, J. S. Madureira, M. S. Soares, and R. P. C. do Nascimento, "Influence of Human Personality in Software Engineering - A Systematic Literature Review," In *International Conference on Enterprise Information Systems*, SciTePress, 2017, pp. 53-62. https://doi.org/10.5220/0006292000530062.

[7] J. Passmore and I. Netlibrary, *Psychometrics in coaching: Using psychological and psychometric tools for development*. London ; Philadelphia: Kogan Page, 2008.

[8] I. B. Myers, M. H. McCaulley, and R. Most, *MBTI manual: A guide to the development and use of the Myers-Briggs Type Indicator*, Consulting Psychologists Press, 1985.

[9] M. Chugh, A. Pandey, and S. Vyas, "A Comprehensive Study on the Association Between Personality Traits and Software Development," In *Proceedings of the 4th International Conference on Information Management & Machine Intelligence*, Dec. 2022, pp. 1-6. https://doi.org/10.1145/3590837.3590900.

[10] G. M. Cavallera, A. Passerini, and A. Pepe, "Personality traits and the role of gender in swimmers at the leisure level," *Social Behavior and Personality: an international journal*, vol. 41, no. 4, pp. 693–703, May 2013. https://doi.org/10.2224/sbp.2013.41.4.693.

[11] I. B. Myers and P. B. Myers, *Gifts differing: understanding personality type*. Palo Alto, Calif.: Davies-Black Pub, 1995.

[12] C. G. Jung and H. E. Read, *Psychological types*. New York, Ny: Pantheon Books, 1974.

[13] D. Keirsey, *Please understand me II: temperament, character, intelligence*. Del Mar, Ca: Prometheus Nemesis, 1998.

[14] G. Lawrence and C. R. Martin, *Building people, building programs : a practitioner's guide for introducing the MBTI to individuals and organizations*. Gainesville, Fla.: Center For Applications Of Psychological Type, 2001.

[15] L. F. Capretz and F. Ahmed, "Why do we need personality diversity in software engineering?," *ACM SIGSOFT Software Engineering Notes*,

vol. 35, no. 2, pp. 1–11, Mar. 2010. https://doi.org/10.1145/1734103.1734111.

[16] "Iran Personality Profile | Country Personality Profiles | 16Personalities," *www.16personalities.com*. https://www.16personalities.com/country-profiles/iran (accessed Jan. 21, 2023).

[17] L. F. Capretz, D. Varona, and A. Raza, "Influence of personality types in software tasks choices," *Computers in Human Behavior*, vol. 52, pp. 373–378, Nov. 2015. https://doi.org/10.1016/j.chb.2015.05.050.

[18] N. A. Schaubhut and R. C. Thompson, *MBTI type tables for occupations*. CPP, Mountain View, Calif., 2008.

[19] K. S. Choi, F. P. Deek, and I. Im, "Exploring the underlying aspects of pair programming: The impact of personality," *Information and Software Technology*, vol. 50, no. 11, pp. 1114–1126, Oct. 2008. https://doi.org/10.1016/j.infsof.2007.11.002.

[20] L. F. Capretz, "Are software engineers really engineers?," *World Transactions on Engineering and Technology Education*, vol. 1, no. 2, pp. 233–235, Jan. 2002.

[21] P. Barnes, "Programmer paranoia revisited," In *Proceedings of the thirteenth annual SIGCPR conference*, 1975, pp. 114-131. https://doi.org/10.1145/800149.804879.

[22] E. A. Buie, "Psychological Type and Job Satisfaction in Scientific Computer Professionals," *Journal of Psychological Type*, vol. 15, pp. 50–53, 1988.

[23] A. Falk and J. Hermle, "Relationship of gender differences in preferences to economic development and gender equality," *Science*, vol. 362, no. 6412, p. eaas9899, Oct. 2018. https://doi.org/10.1126/science.aas9899.

[24] D. Russo and K.-J. Stol, "Gender Differences in Personality Traits of Software Engineers," *IEEE Transactions on Software Engineering*, vol. 48, no. 3, pp. 819-834, 2020. https://doi.org/10.1109/tse.2020.3003413.

[25] D. Keirsey and M. M. Bates, *Please understand me: character & temperament types*. Del Mar, Ca: Distributed By Prometheus Nemesis Book Company, [Post], Cop, 2006.

[26] O. Kroeger, J. M. Thuesen, and H. Rutledge, *Type talk at work : how the 16 personality types determine your success on the job*. New York: Dell Pub, 2002.

[27] N. Saher, R. M. Khan, and M. Saleem, "Relationship between Birth Order and Personality Trait (Extroversion)," *Canadian Journal of Educational and Social Studies*, vol. 2, no. 1, pp. 1–15, Jan. 2022, https://doi.org/10.53103/cjess.v2i1.12.

[28] Soroush Elyasi and Fattaneh Taghiyareh, "MBTI-Based Personality Assessment through Introducing a Puzzle Game," In *2023 9th International Conference on Web Research (ICWR)*, IEEE, May 2023, pp. 102-107. https://doi.org/10.1109/icwr57742.2023.10139311.

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