Comparing Cuban and Brazilian software engineers

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ABSTRACT: The Myers-Briggs Type Indicator (MBTI) is used as a tool to identify personality types of software engineers from both Brazil and Cuba. Subsequently, the similarities and differences in the personality profiles of Brazilian and Cuban software engineers are presented and the implications of such comparisons for software development are discussed. Results show that Cuban software engineers tend to be extroverts, whereas Brazilian developers tend to be introverted. Among specific personality types, there were substantial differences between the two samples with regard to ESTJ, ISTJ and INTP types (Introversion, Sensing, Thinking, Judgment).

INTRODUCTION

Educators have been using the Myers-Briggs Type Indicator (MBTI) to develop teaching methods and to understand both individual learning styles and differences in motivation [1]. Software project leaders can also use this instrument to organise tasks and to delegate roles to appropriate people in order to develop efficient management methods. The MBTI utilises four dimensions of preferences, each dimension having two opposing poles that characterise a specific individual. Although all eight preferences can apply to a specific individual, there is one preference from each dimension that describes an individual's personality most accurately. The scales and dimensions are as follows:

a) Extroversion and Introversion (E and I): While some people are oriented towards a breadth-of-knowledge approach with quick action, others are focused on a depth-of-knowledge approach, reflecting on concepts and ideas. Jung calls these orientations extroversion and introversion.
b) Sensing and Intuition (S and N): Some people are attuned to the practical, hands-on, common-sense view of events, while others are more attuned to the complex interactions, theoretical implications, or new possibilities. These two styles of information gathering or perception are known as sensing and intuition respectively.
c) Thinking and Feeling (T and F): Some individuals typically draw conclusions or make judgments dispassionately and analytically, and others consider human factors of societal importance and make judgments with personal conviction as to their value. The first type of decision-making is known as thinking, while the other type is called feeling.
d) Judgment and Perception (J and P): Finally, some people prefer to collect sufficient data before setting out on a direct path to a goal, and these people typically stay on that path. Other individuals are finely attuned to changing situations and alert to new developments that may require a change of strategy or a modification of goals. These two styles are respectively referred to as the preferences for judgment or perception.

Based on the existence of four dimensions and two preferences per scale, there are 16 possible configurations, as presented in Table 1. If the MBTI results show that a person is ISTJ (i.e. Introversion, Sensing, Thinking, Judgment), then, the correct terminology is to suggest that the person *prefers* ISTJ.

There are many practical uses for the MBTI as applied to software projects. First, software developers can improve their work habits by knowing their MBTI type and, by exhibiting different behaviours associated with each preference, learn and work more efficiently.

Secondly, software project managers or human resources employees can use the MBTI to assess the personality types of employees and provide, as both teachers and students do with their teaching and learning styles, advice if an individual's behaviour conflicts with the team leader's management style or with the rest of the team.

Table 1: The 16 MBTI types and their distribution among the US adult population [1].

ISTJ 11.6%	ISFJ 13.8%	INFJ 1.5%	INTJ 2.1%
ISTP 5.4%	ISFP 8.8%	INFP 4.4%	INTP 3.3%
ESTP 4.3%	ESFP 8.5%	ENFP 8.1%	ENTP 3.2%
ESTJ 8.7%	ESFJ 12.3%	ENFJ 2.5%	ENTJ 1.8%

BRAZILIAN SOFTWARE ENGINEERS

Many people outside of the engineering field seem to possess ideas and stereotypes about the personalities of engineers and the factors that attract them to the engineering field. The subjects of this study comprise a group of Brazilian software engineers, who were selected to take part in this survey based on their solid backgrounds and interest in software development.

Specifically, 68 engineers were invited to participate in the study, and the participants were administered the MBTI instrument, Form G, Portuguese language version, to determine their personality types. They were invited to take the MBTI measure either at home or in the workplace, but they were instructed not to complete the instrument in a work setting. The developers were selected to take part in this survey based on their solid background and interest in software development. The distribution representing the personality types of these Brazilian engineers is summarised in Table 2 and Table 3.

Table 2: Personality type distribution of Brazilian software engineering students (N = 68) [2].

ISTJ 13 19.1%	ISFJ 2 2.9%	INFJ 1 1.5%	INTJ 5 7.4%
ISTP 3 4.4%	ISFP 3 4.4%	INFP 2 2.9%	INTP 9 13.2%
ESTP 8 11.8%	ESFP 1 1.5%	ENFP 2 2.9%	ENTP 5 7.4%
ESTJ 8 11.8%	ESFJ 2 2.9%	ENFJ 1 1.5%	ENTJ 3 4.4%

This study shows that the personality types ISTJ, INTP, ESTP and ESTJ compose almost 56% of the sample and are, therefore, over-represented. On the other hand, the configurations of INFJ, ESFP and ENFJ are all particularly under-represented in this Brazilian sample. Moreover, this research also found a greater proportion of introverts (I = 55.9%) than extroverts (E = 44.1%), fewer intuitive individuals (N = 41.2%) than sensing people (S = 58.8%), significantly more thinking (T = 79.4%) than feeling types (F = 20.6%), and slightly more judgmental (J = 51.5%) than perceiving (P = 48.5%) individuals.

Table 3: MBTI distribution among Brazilian software developers.

Type	Quantity	% of Total
E	30	44.1
I	38	55.9
S	40	58.8
N	28	41.2
T	54	79.4
F	14	20.6
J	35	51.5
P	33	48.5

As can be seen in Table 4, STs (Sensing and Thinking) and ITs (Introverted and Thinking) are the dominant temperaments among Brazilian software engineers. Conversely, NFs, FJs and EFs are the scarcest temperaments in the sample. According to the MBTI, Sensing and Thinking individuals adopt a less methodical, but more creative and practical manner, whereas IT people rarely act before seriously considering their choices, and their decisions are based on a logical and objective analysis.

Table 4: Brazilian software engineers' temperament distribution.

Temperament	Quantity	%	Temperament	Quantity	%
SP	15	22.1	TJ	29	42.6
SJ	25	36.8	TP	25	36.8
NT	22	32.4	FP	8	11.8
NF	6	8.8	FJ	6	8.8
IJ	21	30.9	IN	17	25.0
IP	17	25	EN	11	16.2
EP	16	23.5	IS	21	30.9
EJ	14	20.6	ES	19	27.9
ST	32	47.1	ET	24	35.3
SF	8	11.8	EF	6	8.8
NP	18	26.5	IF	8	11.8
NJ	10	14.7	IT	30	44.1

CUBAN SOFTWARE ENGINEERS

In addition to Brazilian software engineers, 103 Cuban software engineers were also surveyed [3]. In this case, the MBTI instrument, Form M, Spanish language version, was used to identify their personality types. The personality type distribution that resulted from the surveys is summarised in Table 5 and Table 6.

Among the 16 possible MBTI combinations, the ESTJ personality type received the greatest representation, with 26% of the surveyed Cuban software engineers possessing this type, as shown in Table 5.

The next most common configuration was ESTP, which describes 13% of the Cuban software engineers, and ISTJ, which denotes 10% of these individuals. In fact, ESTJ, ESTP and ISTJ represent almost the half of the sample population. Alternatively, INFJ and INFP were the least represented personality types, each indicated by 1% of the population, followed by ISFP, ENTP and ESFJ, each representing 2% of the Cuban software engineers.

Table 5: MBTI distribution among Cuban software engineers.

ISTJ 10%	ISFJ 7%	INFJ 1%	INTJ 6%
ISTP 5%	ISFP 2%	INFP 1%	INTP 6%
ESTP 13%	ESFP 6%	ENFP 3%	ENTP 2%
ESTJ 26%	ESFJ 2%	ENFJ 3%	ENTJ 7%

In addition, Cuban software engineers are more likely to be extroverts (63%) than introverts (37%). Similarly, sensing individuals (71%) dominate over intuitive individuals (29%); thinking people (75%) are more common than feeling people (25%), and judging individuals (61%) outnumber perceiving individuals (39%).

Furthermore, the temperament distribution is documented in Table 7. The dominant temperament is ST, with 54.4% of Cuban software engineers possessing this personality type, while TJ (48.5%), ES (47.6%) and ET (48.5%) are also well-represented. Conversely, NF (8.7%) and IF (10.7%) are the least represented temperaments, as shown in Table 7, while FJ, FP and NP are also fairly uncommon, each configuration being evident in 12.6% of the total population.

Table 6: MBTI distribution among Cuban software engineers (n = 68).

Type	Quantity	% of Total
E	65	63
I	38	37
S	73	71
N	30	29
T	77	75
F	26	25
J	63	61
P	40	39

Table 7: Cuban software engineers' temperament distribution.

Temperament	Quantity	%	Temperament	Quantity	%
SP	27	26.2	TJ	50	48.5
SJ	46	44.7	TP	27	26.2
NT	21	20.4	FP	13	12.6
NF	9	8.7	FJ	13	12.6
IJ	24	23.3	IN	14	13.6
IP	14	13.6	EN	16	15.5
EP	26	25.2	IS	24	23.3
EJ	39	37.9	ES	49	47.6
ST	56	54.4	ET	50	48.5
SF	17	16.5	EF	15	14.6
NP	13	12.6	IF	11	10.7
NJ	17	16.5	IT	27	26.2

DISCUSSION

Although Brazilian and Cuban software engineers share many similarities in their personality type distributions, there are also some differences between these two groups. For instance, ISTJ configurations (19.1%) dominate in the Brazilian sample, while ESTJ arrangements (26%) predominate in the Cuban sample. Conversely, INFJ and INFP are under-represented among Cuban subjects, whereas the least represented types among Brazilians were INFJ, ESFP and ENFJ, each of which only accounted for 1.5% of the population; they all were feeling (F) and, mainly intuitive (N) and feeling (F) nature.

The most prominent discrepancies between the two groups occur in the following types: ESTJ, which accounts for 11.8% of the Brazilians as opposed to 26% of the Cubans; ISTJ, which is demonstrated in 19.1% of Brazilians versus 10% of the Cubans; and INTP, which is shown in 13.2% of the Brazilians and only 6% of the Cubans; the trends of other remaining cells are more in accord.

It is important to examine the behaviour in the different dimensions. In the sensing/intuitive (SN) dimension, both Brazilians and Cubans are more sensing than intuitive. Similarly, in the judging/perceiving (JP) dimension, judging individuals outnumber sensing people for both Brazilians (J = 51.5%, P = 48.5%) and Cubans (J = 61%, P = 39%). Finally, thinking people highly outnumber feeling individuals in both samples, with 79.4% and 75% of Brazilian and Cuban software developers respectively being thinkers.

However, there were significant differences between the two groups within the introvert/extrovert (IE) scale, where more Cubans are extroverts (E = 63%) than introverts (I = 37%). On the other hand, Brazilians tended to be introverted (I = 55.9%) as opposed to extroverted (E = 44.1%). The implications of this discrepancy not only highlight international personality differences among software engineers, but they also demonstrate that software developers are not necessarily introverts, as shown in the Cuban sample. The introvert/extrovert proportion in the Cuban sample may help dismiss a common complaint among the historical studies that point to software developers in the main being introverts.

The largest differences among the temperaments occur in the IT temperament, followed by the NP and NT temperaments, where, in all cases, the Brazilians have higher percentages than the Cuban software developers. Conversely, the ES temperament is the most represented in the Cuban sample, followed by the EJ and ET temperaments.

CONCLUSIONS

All personality types are important for software engineering, as every type can make a contribution towards solving problems referred to as a so-called *software crisis*. Specifically, diverse personalities are increasingly necessary for solving the numerous and complex challenges related to software development [4].

In particular, two main differences are evident in the comparative analysis between Cuban and Brazilian software developers:

- Cuban software engineers tend to be extroverts whereas Brazilian developers tend to be introverted.
- Among the specific personality types, there were remarkable differences between the two samples with regards to ESTJ, ISTJ and INTP types.

Cultural and organisational factors can have a significant influence on personality differences. The particular traits in the software development models for each industry seem to be the main element in determining the required roles and competencies, which consequently causes differences in the personality types among software engineers of various nationalities.

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