

A Survey on Popular Human Factors in Agile Environment

¹Faten Alia Zainal Abidin and ²Imran Ghani*

¹*Faculty of Computing, Universiti Teknologi Malaysia, Johor Bahru, Malaysia*

²*School of Information Technology, Monash University Malaysia, Bandar Sunway, Malaysia*

*[e-mail: fatenalia@gmail.com, *Imran.ghani@monash.edu]*

Abstract

Various studies have proven that human is the biggest challenge in the process of transitioning to agile. Culture and mindset are two critical elements of human factors causing issues in agile environment. This study involved thirty-two (32) agile practitioners from nineteen (19) country to validate the issues from human factors. The purpose of the study is to discover human factors that required more attention and factors that give a low impact on the agile environment. Furthermore, this paper presents research analysis on some of popular human factors such as collaboration, hierarchy, communication and other critical factors which company may face. The results of this analysis can be used as a guide for IT organization to consider the critical challenges they may encounter.

Keywords: *Agile Transition Challenge, Agile Issues, Agile Development Limitations, Agile Human Factors, Agile Transformation.*

1. Introduction

This paper presents the justification for selecting the six (6) popular human factors in agile environment. This chapter also presents survey-based analysis and interpretation of results obtained from the data collected online using electronic questionnaire. The structure of this paper is as follows: Section 2 contains a literature review of issues arise on the five (5) popular human factors in agile environment. Section 3 discusses research analysis. Section 4 contains discussion of the obtained results. Section 5 covers conclusion of the survey analysis.

2. Literature Review

From the literature review, we have identified the challenges in agile transition. The purpose of identifying the challenges in an agile environment is to find the pattern of the challenges. It's true that different project has different challenges. However, in terms of human factors, we can see that the challenges arise is almost

the same. Therefore, to tackle these challenges, human behavior towards changes or in an agile environment must studied deeply.

There are six (6) human factors that are repeatedly mentioned in the literature review. The factors are hierarchy, transparency, control, trust and collaboration. The justification of each factor is explained in Table 1 below.

Table 1. Human Factors in Agile Environment

Factors	Who	Issues
Hierarchy	Top-level management	In government team members were not allowed to argue with their boss in order to make things better (Sutharshan, 2013).
	Individual	Team members works really well with each other but this changes when a person with more power and authority is around (Sutharshan, 2013).
	Top-level management	Sometimes team already works pretty well as Agile and were able to make a quick decision however hierarchy stops them from progressing since they have to wait for management for the decision making (Sutharshan, 2013).
	Top-level management	Team members are afraid to talk to the manager because they think it is a waste because manager will not hear the problems (Sutharshan, 2013).
	Top-level management	Team members were not allowed to talk to the big boss and there is no openness (Sutharshan, 2013).
	Individual	Employee thinks and feel they have to make sure boss is always satisfied (Sutharshan, 2013).
	Top-level management	Team members avoid to make any critical decision to let higher management to decide (Sutharshan, 2013).
	Team	Team members depends on the manager to make decision causing them having difficulties to make one (Sutharshan, 2013).
	Top-level management	Time taken to make a decision is long due to hierarchy (Sutharshan, 2013).
	Top-level management	Structure sometimes stops team members from making decision (Sutharshan, 2013).
	Project manager	The managers were expected to make the decisions, the timeliness sometimes gets delayed (Sutharshan, 2013)
	Project manager	Very strong hierarchy where the manager always make the decision (Sutharshan, 2013).
	Team	Although team members are allowed to make a decision there is still hierarchy culture that stops them from making decision (Sutharshan, 2013).
Transparency	Top-level management	Due some specific reasons, information are not communicated very well to the different areas of organization (Sutharshan, 2013).
	Team	Opportunity are not given to the team to speak out and express their ideas (Sutharshan, 2013).
	Individual	Individual tends not to speak because of fears being misinterpreted and to stay away from any conflicts or issues (Sutharshan, 2013).
	Team	Feel uncomfortable to discuss issues openly and prefer to keep it to their selves (Sutharshan, 2013).
	Individual	Some people hide and keep things undercover for no purpose

		(Sutharshan, 2013).
	Team	Team members claimed they did not see the bigger picture of the project since they are expected not to know them (Sutharshan, 2013)
	Team	Team members came up with brilliant ideas that sometimes impossible to accomplish thus give customers false promises (Sutharshan, 2013).
	Top-level management	Details were only passed down because not everyone involve in decision making (Sutharshan, 2013).
	Individual	Sometimes individual tends to hide information and causing the decrease in team's learning capacity (Kozak, 2013).
	Senior Project manager	Some experienced people hide information intentionally (Kozak, 2013) PM do not escalate the problem and always don't say the truth to manager (Sutharshan, 2013).
	Project manager	PM hide things to the project members till the last minute to highlight the crucial problems (Sutharshan, 2013).
	Team	Team members tends to hide things until they realize that things have gone very serious (Sutharshan, 2013).
	Team	hide and not escalate any project critical issue (Sutharshan, 2013)
	Individual	Some people do not communicate or explain the issues concerning the project to the team leader (Sutharshan, 2013).
	Team	Do whatever clients ask to do in order to make them happy but the reality is impossible to be done (Sutharshan, 2013).
	Team	Team members gave false promises as deadline date earlier than it possibly be in order to make clients happy (Sutharshan, 2013).
Control	Individual	Individual preferred to have a leader to control and manage them because they worried if something goes wrong (Gandomani, 2014).
	Individual	"command and control" mindset (Gandomani, 2014)
	Individual	People are used to be structured on control and they did not used to be flexible (Tanner, 2014).
Hinder	Individual	Passing the responsibility to avoid problems (Sutharshan, 2013)
	Individual	Individual who are uncomfortable with having conflict will try to avoid any confrontation on even responsibility it (Kozak, 2013).
	Team	Point out each other fault to avoid responsibility when something goes wrong (Kozak, 2013).
Collaboration	Individual	Uncomfortable interacting and working with people on different level with them (Tanner, 2014).
	Individual	People are too passionate with their work but didn't feel like collaborating (Sutharshan, 2013).
	Team	Lack of peer support and team work, as well as a resistance from groups or individuals (Tanner, 2014)
	Team	Team members are individualistic because of a lack of cross-training (Bannink, 2014)
	Project manager	Overloaded and had little time to spare to help make it happen. In hindsight PM was another ally, could have greatly assisted team to help break down/translate requirements into stories (O'Connor, 2010)
	Individual	Individual who do not following meeting rules by talking about other things disturb others and causes meeting to extend (Kozak, 2013).
	Individual	Some members keen to leave the meeting after providing their updates to continue to do their work causing them to missed some important things

		during the meeting (Lalsing, 2012).
	Team	Team members are busy with their own task and cannot respond to support request from other members (Kozak, 2013).
	Teams	Lack of familiarity between the team member (Lalsing, 2012)
	Ceo	CEOs do not give commitment (Gandomani, 2014).
	Teams	Meeting had to be done again separately because consensus is difficult to get (Lalsing, 2012).
	Scrum master	Scrum master are not committed to the process (Esfahani, 2010).
	Team	Team members have trouble to fit themselves into overall Agile team since there were two sub Agile teams (Lalsing, 2012).
	Scrum master	Scrum master fail to achieve facilitated customer/team collaboration (Esfahani, 2010)
	Team	Some team members do not share information from Business Analyst because either they forget to pass the information or they think it is not relevant to others (Lalsing, 2012).
	Individual	Some team members have no discipline during working (Kozak, 2013).
Communication	Team	Deficiency of clear communication on requirements raised by different teams (Lalsing, 2012).
	Scrum master	Scrum Master don't have strong communication skills (Esfahani, 2010).
	Team	Team members are not communicating enough with each other and sometimes they are seated more than 10 meters away (Kozak, 2013).
	Team	Team members trying to solve problems through email instead of face-to-face communication could affect the relationship between them (Kozak, 2013).
	Team	Some of team members still use chat tools to communicate instead of face to face interaction (Lalsing, 2012).

3. Research Analysis

In order to identify the validity of the human factors identified in the literature review, we have created a survey questionnaire. A total number of 100 questionnaires were distributed among 32 respondents with experience in agile through LinkedIn. There were 34 questions asked in which reflect failure factors considers in adoption and implementation of agile software development methods. Example questions asked in the surveys are as follows:

- 1) I am allowed to make decision.
- 2) I feel that top management are providing enough openness (give ideas, make decision).
- 3) If I feel comfortable, then I'll become transparent and open in group meetings.
- 4) I prefer to have my role as a leader to control critical situation.
- 5) I rather pass the critical responsibility to avoid problems.
- 6) I feel that I have the environment and support I need to get my job done.
- 7) I feel so occupied with my tasks and cannot respond to support requests from other members.
- 8) I find it easy to ask other people for help.
- 9) I agree with the top management decision to become agile.
- 10) I feel more comfortable in face-to-face communication.
- 11) I feel more comfortable to communicate through email or chat.

3.1 Hierarchy

From the literature review, hierarchy is one of the most highly mentioned human factors. It is stated that team members are not given enough openness from top-level management to give ideas or allowed to make a decision. They are also afraid to talk because they feel that it is not going to be heard. Therefore, Figure 1 and Figure 2 are the results to validate that hierarchy is one of the biggest human factor in agile environment.

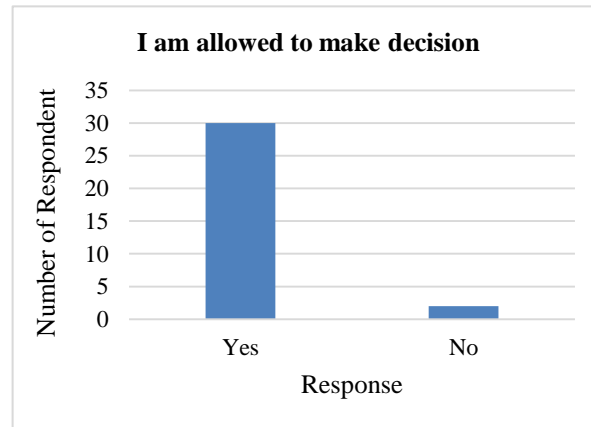


Figure 1. I am allowed to a make decision (N=32).

Figure 1 shows the number of respondents who agreed and disagreed that they are allowed to make a decision. Thirty (30) of respondents agreed while two of respondents disagreed. This shows that most of the respondents are agreed that they are allowed to make a decision

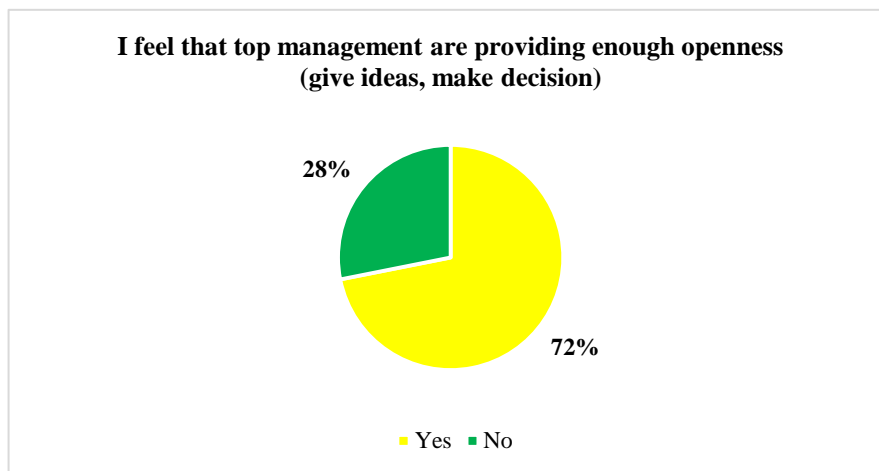


Figure 2. I feel that top management are providing enough openness (give ideas, make decision) (N=32).

Figure 2 shows the percentage of respondents who agreed and disagreed that top management are providing enough openness (give ideas, make decisions). 72% of respondents agreed and 25% of them disagree. From the results, more that 50% respondents agreed that top management are providing enough

openness

3.2 Transparency

From the literature review, transparency was mentioned to be one of human factor in agile environment. It is said that team members are not being transparent as stated in Table 1. Therefore, Figure 3 shows the results to validate whether transparency is one of the human factors in agile environment or not.

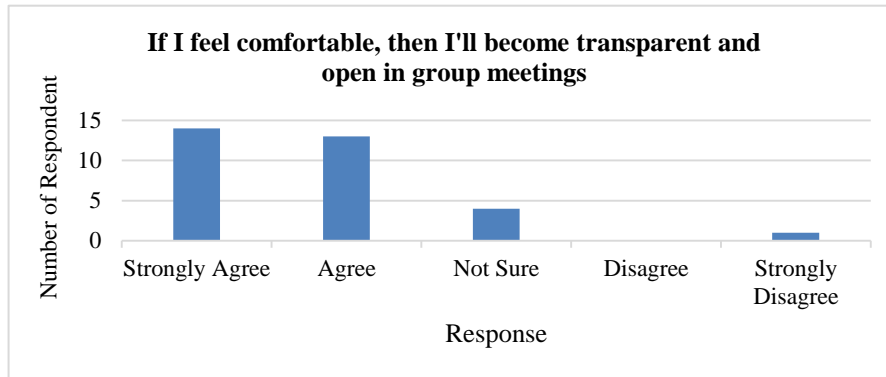


Figure 3. If I feel comfortable, then I'll become transparent and open in group meetings (N=32).

Figure 3 shows the number of respondents who agreed and disagreed that they are being transparent. From the analysis, fourteen (14) of respondents strongly agree, thirteen (13) of the respondents agree, four (4) of respondents not sure, one (1) of respondents strongly disagree and none of the respondents disagree. This shows that most of the respondents strongly agree and agree that if they feel comfortable, then they will become transparent and open in group meetings.

3.3 Control

From the literature review, control is mentioned to be one of human factor in agile environment. Team members are preferred to have a leader to control them. Therefore, Figure 4 shows the results to validate whether control is one of the human factors in agile environment or not. Figure 4 below shows the number of respondents who agreed and disagreed that they prefer to have the role as a leader to control the critical situation based on their position in the company.

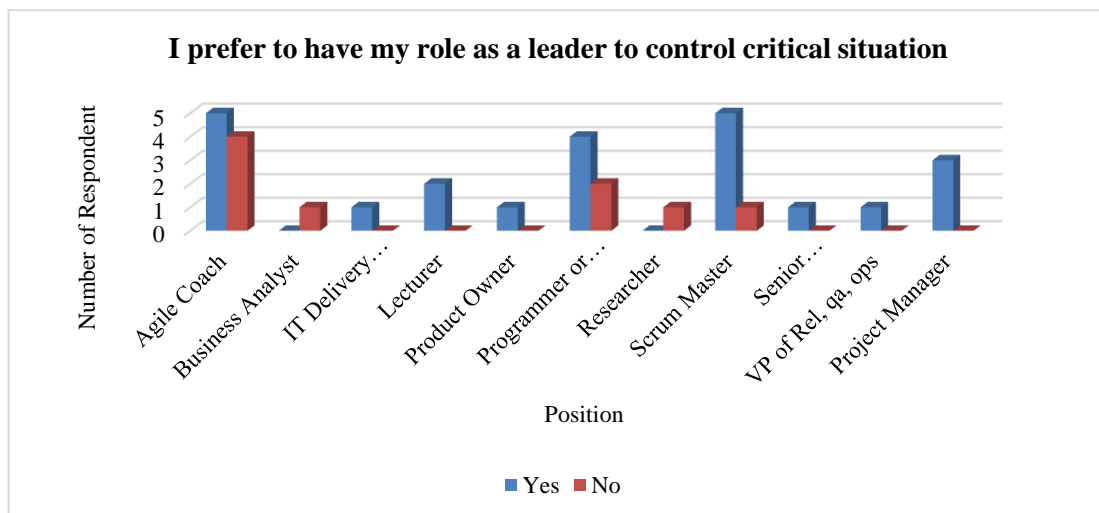


Figure 4. I prefer to have my role as a leader to control critical situation (N=32).

From Figure 4, twenty-three (23) of respondents agreed to have their role as team leader to control the situation and nine of respondents disagree. These results show that most of the respondents agreed to have their role as team leader to control the situation. Meanwhile, based on the position of the respondents, agile coach and scrum master have the highest number of respondents agreed that while none of the respondents from a business analyst and researcher agreed to have their role as team leader to control the situation.

3.4 Hinder

From the literature review, hinder is mentioned to be one of human factor in agile environment. Team members are preferred to pass critical problems to avoid responsibility or conflict. Therefore, Figure 5 shows the results to validate that hinder is one of the human factors in agile environment

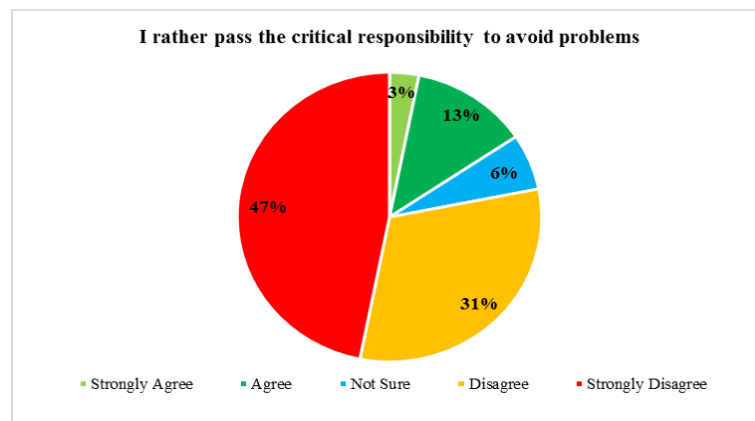


Figure 5. I rather pass the critical responsibility to avoid problems (N=32).

Based on the results in Figure 5, 47% of respondent strongly disagree, 31% of respondent disagree, 6% of respondent not sure, 31% of respondent agree, and 3% of respondent strongly agree. This result shows that over 50% of respondents disagreed that they rather pass the critical responsibility to avoid problems

3.5 Collaboration

From the literature review, collaboration is highly mentioned to be one of human factor in agile environment. It is stated in literature review that lack of collaboration gives a negative impact to the team. Therefore, Figure 6, Figure 7, Figure 8 and Figure 9 shows the results to validate that collaboration is one of the human factors in agile environment

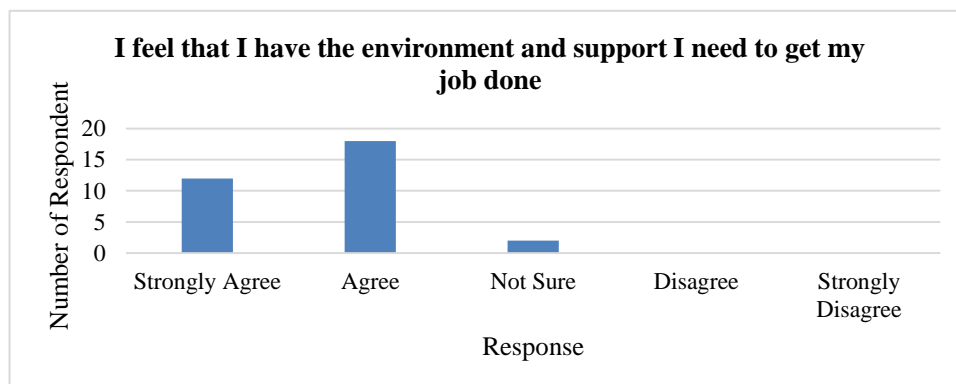


Figure 6. I feel that I have the environment and support I need to get my job done (N=32).

Based on results in Figure 6, twelve (12) of respondents strongly agree, eighteen (18) of the respondents agree, two (2) of respondents not sure while none of the respondents disagree and strongly disagree with the statement. From the results, it is shown that most of respondent agrees that they have the environment and support they need to get their job done and none of them disagree.

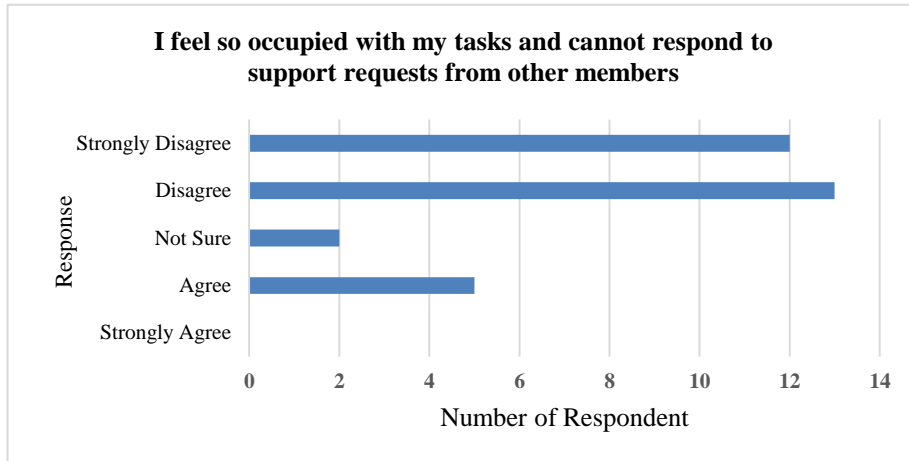


Figure 7. I feel so occupied with my tasks and cannot respond to support requests from other members (N=32).

Based on results in Figure 7, twelve (12) of respondents strongly disagree, thirteen (13) of respondents disagree, two (2) of respondents not sure, five (5) of respondents agree and none of respondents strongly agree. From the results obtained, most of respondent disagree that they feel so occupied with their tasks and cannot respond to support requests from other members.

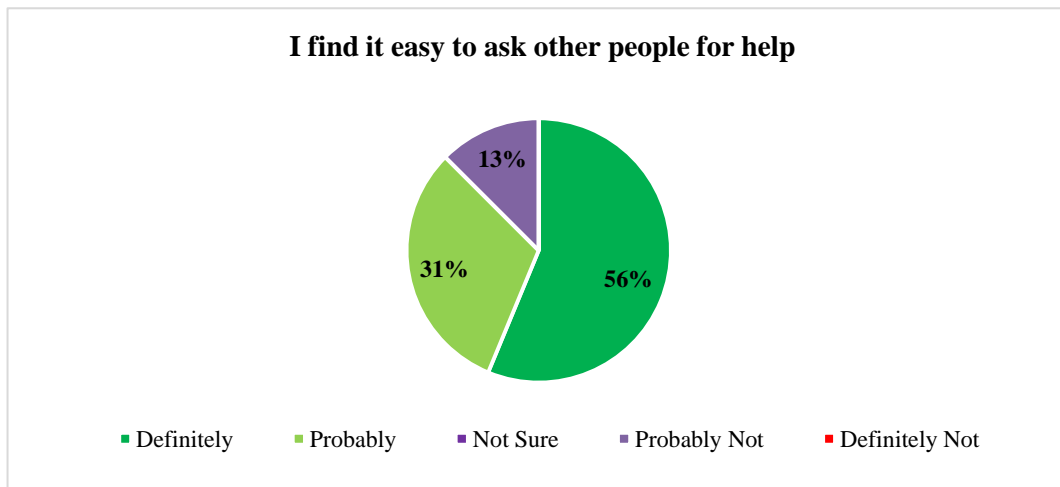


Figure 8. I find it easy to ask other people for help (N=32).

Based on results in Figure 8, 56% of respondents answered definitely, 31% of respondents answer, probably, 13% of respondents answer not sure, while none of respondents answer for not sure and definitely

not. From the results obtained, most of respondent agrees that they find it easy to ask other people for help.

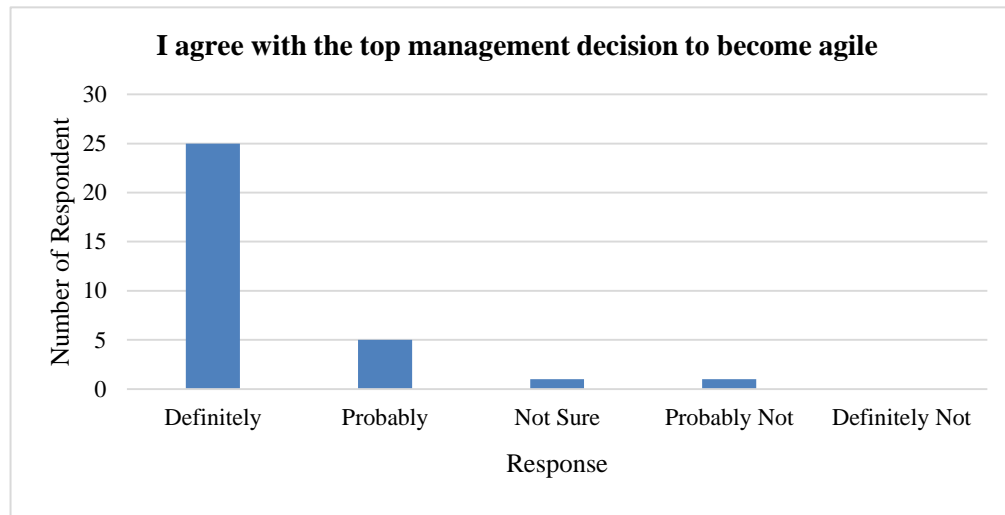


Figure 9. I agree with the top management decision to become agile (N=32).

Based on results in Figure 9, twenty-five (25) of respondents answer definitely, five (5) of respondents answer probably, one (1) of respondents answer not sure, one (1) of respondents answers probably not, and none of respondents answer definitely not. From the results obtained, most of respondent agrees with the top management decision to become agile.

3.6 Communication

From the literature review, communication is mentioned to be one of human factor in agile environment. As stated in literature review, team members are lack in communication. Therefore, Figure 10 and Figure 11 shows the results to validate whether communication is one of the human factors in agile environment.

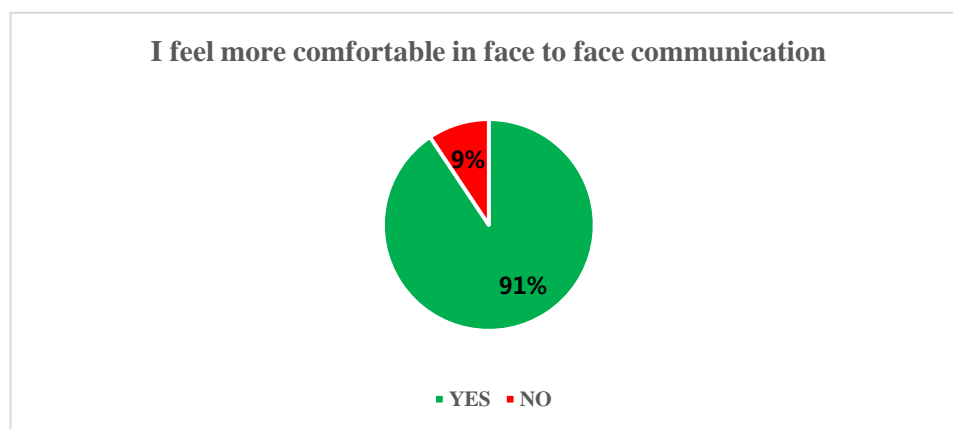


Figure 10. I agree with the top management decision to become agile (N=32).

Figure 10 shows the number of respondents who agreed and disagreed that they feel more comfortable with face-to-face communication. 91% of the respondents agree and 9% of them disagree. The results show that most of the respondents feel more comfortable with face-to-face communication.

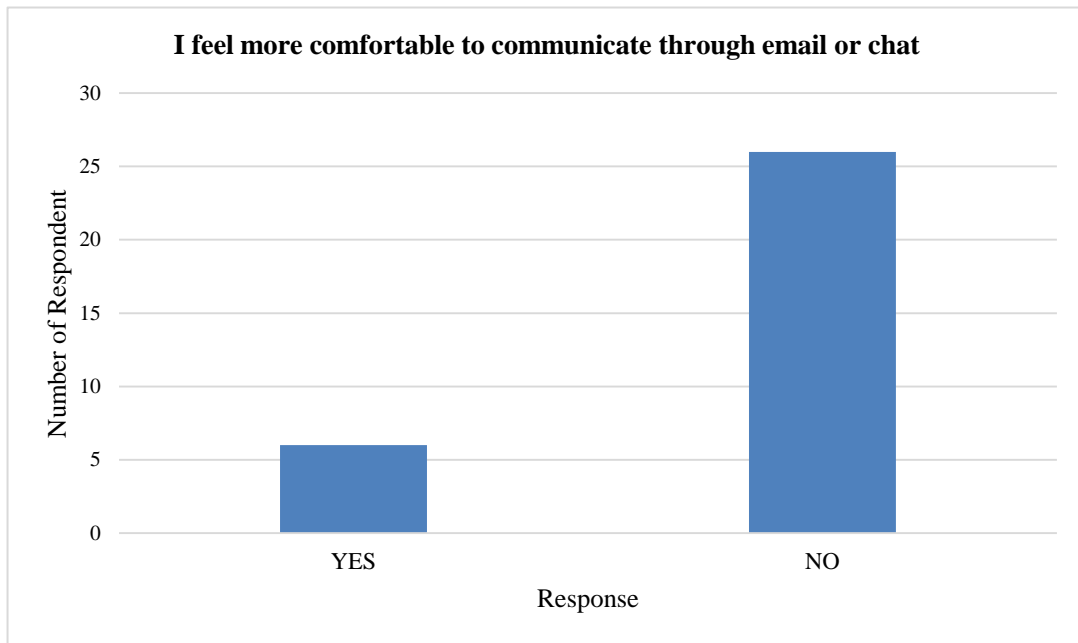


Figure 11. I feel more comfortable to communicate through email or chat (N=32).

Figure 11 shows the number of respondents who agreed and disagreed that they feel more comfortable to communicate through email or chat. Twenty-six (26) of the respondents agreed and six (6) of them disagreed. The results show that most of the respondents feel more comfortable to communicate through email or chat.

4. Discussion

This section discusses on the differences between the concepts of academics and industrial practitioners based on research analysis. Table 2 below show how we integrate the answer into agree, not sure and disagree. Therefore, Figure 12 shows the summary of respondent’s answers to the survey questions.

Table 2. Integration of Answer for Survey Questions into Agree, Not Sure and Disagree

Answer for Survey Questions	Category
Strongly Agree	Agree
Agree	
Definitely Probably	
Not Sure	Not Sure
Disagree	Disagree
Strongly Disagree	
Probably Not	
Definitely Not	

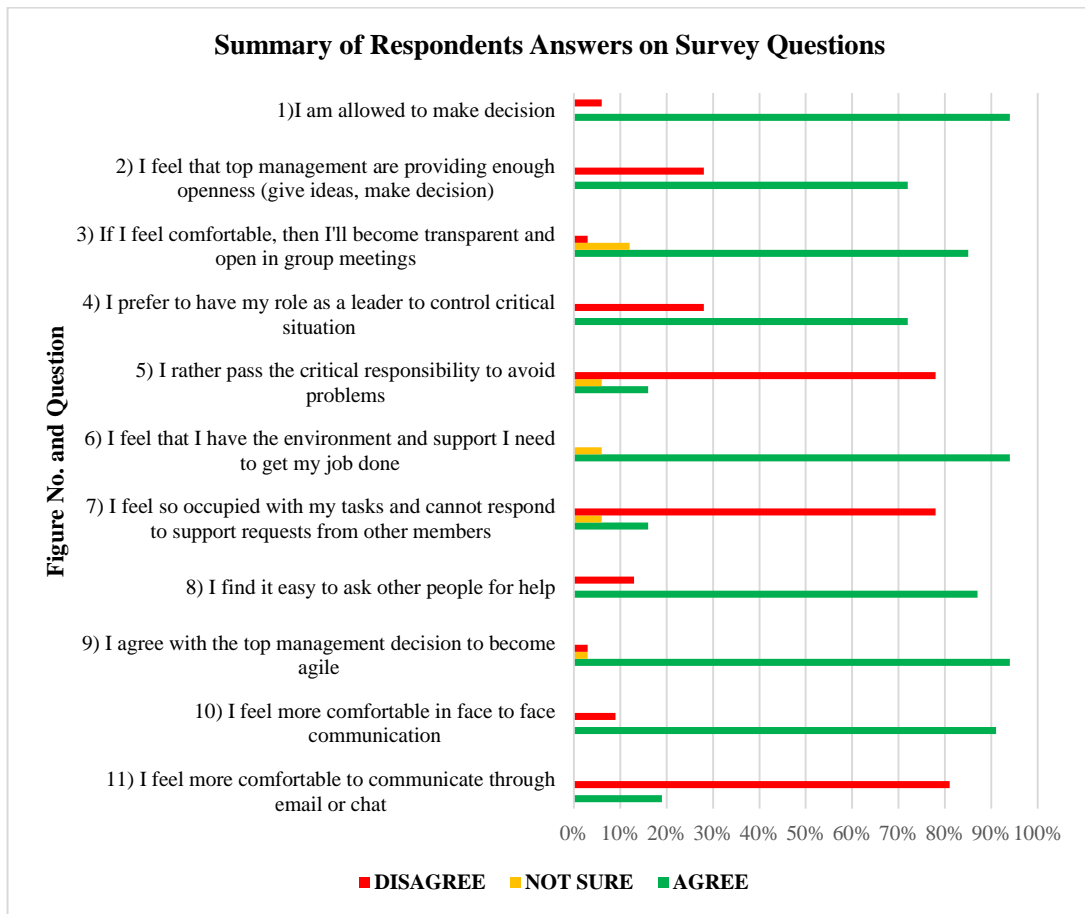


Figure 12. Percentage on Disagree, Not Sure and Agree on Survey Questions

Table 3 is divided into 4 columns. The first column is for human factors, second column is the description of the human factors from literature review, third column is result analysis and the fourth column is comment for the differences between what we have found in the literature review and results obtained from the survey. In the third column, we have integrated the results from each figure into agree, not sure and disagree.

Table 3. Differences Between Literature Review and Results Obtained From the Survey.

Human Factor	Literature Review	Figure No.	Comment
Hierarchy	Team members are not given enough openness from top level management to give ideas or allowed to make a decision. They are also afraid to talk because they feel that it is not going to be heard.	(1), (2)	Results obtained from survey differ from literature review since most of respondents agree that they are allowed to make decisions and they also feel that top management are providing enough openness. However, in our opinion, this result are not from one country or specific region such as Asia. Therefore, we think that results may be different if this survey are done

			in specific regions.
Transparency	Team members are not being transparent in order to avoid conflict and fear of being misunderstood.	(3)	Results obtained from survey differ from the literature review. Most respondents agree that they will become transparent and open in group meetings. However, it is important for the team members to feel comfortable before being transparent. In our opinion, transparency is a low factor in agile environment.
Control	Team members are preferred to have a leader to control them.	(4)	Results obtained from survey differ from literature review because most of respondents agree that they prefer to have their role as a leader to control critical situation. However, we must consider the position of the respondents since the highest number of respondents that agree with the statement are a leader; agile coach and scrum master.
Hinder	Team members are preferred to pass critical problems to avoid responsibility or conflict.	(5)	Results obtained from survey differ from literature review because most of respondents disagree that they rather pass the critical responsibility to avoid problems. In our opinion, the hinder is also a low factor in agile environment. However, we must also take this factor into considerable since they are respondents that are agreed with the statement.
Collaboration	Lack of collaboration gives a negative impact to the team.	(6), (7), (8), (9)	In our opinion, team members are giving their collaboration in their team also receive collaboration from other team members. This is because firstly, most of them feel that they have the environment and support that they need to get their job done thus they have a collaboration that is needed. Secondly, most of them disagree that they feel so occupied with their tasks and cannot respond to support requests from other members. Therefore, it is clearly shown that they are able to give collaboration in teams. Similar to the responds in which they are also receiving the collaboration from other team members since most

		of respondents find it easier to ask other people for help. Last but not least is the responds to the statement where most of respondents agree with the top management decision to become agile. Therefore, collaboration is easy to get from the team since they agree with the decision in the first place.
Communication	Team members are (10), lack in communication. (11)	Results obtained from the survey are differ from literature review because most of the respondents feel comfortable to have the communication face to face instead of using another medium as stated in Table 1. Moreover, results from Figure 11 also shown that most of respondents disagree that they feel more comfortable to communicate through email or chat.

5. Conclusion

This study involved thirty-two (32) agile practitioners from nineteen (19) countries. Based on the survey analysis, we found out that these six (6) factors give more positive impact than negative impact as stated in literature review. Those six (6) factors are hierarchy, transparency, control, hinder, collaboration and communication. From the survey, the results obtained are differ from literature review.

Firstly for hierarchy, most of respondents agree that they are allowed to make decisions and they also feel that top management are providing enough openness. Similar with hierarchy, for transparency factor most respondents agree that they will become transparent and open in the group meetings. However, it is important for the team members to feel comfortable before being transparent.

Survey results for hinder is also differ from literature review in which most of respondents agree that they prefer to have their role as a leader to control critical situation. However, we must consider the position of the respondents since the highest number of respondents that agree with the statement are a leader; agile coach and scrum master. The next factor is collaboration. Based on the survey results, team members are giving their collaboration in their team also receive collaboration from other team members.

Last but not least, communication. Most of respondents feel comfortable to have the communication face to face instead of using another medium. As a conclusion, the results obtained from the survey is different from literature review. This is because the most popular factors mentioned in literature review gave positive impact instead of negative impact.

Acknowledgment

This work was supported by Universiti Teknologi Malaysia (UTM) for research under Tier 1 Scheme with Vot: 09H58.in 2015.

References

- [1] Azham, Zulkarnain, Imran Ghani, and Norafida Ithnin. "Security backlog in Scrum security practices." *Software Engineering (MySEC), 2011 5th Malaysian Conference in*. IEEE, 2011.
- [2] Ghani, Imran, et al. "A Survey of Agile Transition Models." *Emerging Innovations in Agile Software Development*, pp. 141, 2016.
- [3] Ghani, Imran, Mannir Bello, and Idris Lawal Bagiwa. "A Survey-based Analysis of Agile Adoption on Performances of IT Organizations," *인터넷정보학회논문지*, 16.5, pp. 87-92, 2015.
- [4] Arbain, Binti, et al. "Agile non functional requirements (NFR) traceability metamodel." *Software Engineering Conference (MySEC), 2014 8th Malaysian. IEEE*, 2014.
- [5] Ghani, Imran, Zulkarnain Azham, and Seung Ryul Jeong. "Integrating Software Security into Agile-Scrum Method." *TIIS*, 8.2, pp. 646-663, 2014.
- [6] Hoda, Rashina, James Noble, and Stuart Marshall., "Agile undercover: when customers don't collaborate." *Agile Processes in Software Engineering and Extreme Programming. Springer Berlin Heidelberg*, pp. 73-87, 2010.
- [7] Esfahani, H. C., Cabot, J., & Eric, S. K., "Adopting Agile Methods: Can Goal-Oriented Social Modeling Help?" in *RCIS*, pp. 223-234, May 2010.
- [8] França, A. C. C., da Silva, F. Q., & de Sousa Mariz, L. M., "An empirical study on the relationship between the use of agile practices and the success of Scrum projects," in *Proceedings of the 2010 ACM-IEEE International Symposium on Empirical Software Engineering and Measurement, ACM*, pp. 37, September 2010.
- [9] O'Connor, C. P., "Anatomy and physiology of an Agile Transition" in *Agile Conference (AGILE), IEEE*, pp. 302-306, August 2011.
- [10] Prochazka, J., Kokott, M., Chmelar, M., & Krchnak, J., "Keeping the Spin--From Idea to Cash in 6 Weeks: Success Story of Agile/Lean Transformation," in *Global Software Engineering (ICGSE), 2011 6th IEEE International Conference*, pp. 124-130, August 2011.
- [11] Lalsing, V., Kishnah, S., & Pudaruth, S., "People factors in agile software development and project management," *International Journal of Software Engineering & Applications*, 3(1), pp. 117, 2012.
- [12] KOZAK, Y., *Barriers Against Better Team Performance in Agile Software Projects*, Ph.D. Thesis. Chalmers University of Technology, Sweden, 2013
- [13] Sutharshan, A., *Human factors and cultural influences in implementing agile philosophy and agility in global software development*, Ph.D. Thesis. Edith Cowan University, Australia, 2013.
- [14] Gandomani, T. J., Zulzalil, H., Ghani, A. A., Sultan, A. B. M., & Sharif, K. Y., "How human aspects impress Agile software development transition and adoption," *International Journal of Software Engineering and its Applications*, 8(1), pp. 129-148, 2014.
- [15] Tanner, M., & von Willingh, U., "Factors leading to the success and failure of agile projects implemented in traditionally waterfall environments." *Human Capital without Borders: Knowledge and Learning for the Quality of Life. Portoroz, Slovenia: Make Learn*, 2014.
- [16] Bannink, S. (2014). Challenges in the Transition from Waterfall to Scrum—a Case study at Port Base. In 20th Twente Student Conference on Information Technology.
- [17] O'Connor, C. P., "Letters from the edge of an agile transition". in *Proceedings of the ACM international conference companion on Object oriented programming systems languages and applications companion*, ACM, pp. 79-84, October 2010.