Mind your mind:
Social influence on individual decision-making

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Copyright Statement

Abstract

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'Mind your mind: social influence on individual decision-making'

Humans are usually docile. Refraining from the common use of the word, I mean that, human's decisions are generally based on information exchanged within a social system through suggestions, recommendations, comments, and advice. Herbert Simon called this human tendency to rely on socially obtained information (SOI) for decision-making as 'docility'. There are occasions when humans tend to avoid using and interacting with the resources of the environment they are part of, making them mostly non-docile. Hence, docility becomes individuals' dynamic behavioural and cognitive disposition which assists effective completion of cognitive tasks, specifically decision-making. This thesis is one of the very few attempts to investigate the concept of docility to provide it with some level of institutionalization as organizations should 1) understand and highlight value of docility, and 2) establish supporting mechanisms assisting emergence of docility.

The thesis comprises of chapters addressing the challenges of understanding docility within organizational environment. Each chapter has its own focused research objectives responding to the main research questions. First, the thesis provides an in-depth review which unfolds key arguments and debates concerning the development of the concept of docility based on the theory of bounded rationality (BR) and distributed cognition mechanism. This study develops a theoretical framework to identify and explain the effect of docility on the psychology of individual's feedback-seeking behaviour (FSB) using Big Five (BiG5) personality traits including extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (OTE). The study follows Ashford and Cummings' concept of FSB as a day to day proactive socialization tactic to gather informal and evaluative information about one's role requirements and performance. The model proposes docility as a moderator of the relationship between BiG5 personality traits and FSB. Exploring these relationships is particularly important

as there is a strive to uncover the antecedents of FSB as well as find the psychological, cognitive and organizational factors related to docility in a hope of promoting both at workplace. Second, followed by description on methodological aspects, the empirical findings of the study based off the proposed conceptual model are presented. Third, the study tests the model quantitatively through multiple regressions to analyse a sample of 408 observations gathered through online survey from UK based employees working in teams of different organizations. Results of this study indicate that a person's FSB is partially attributable to his or her personality makeup. The research confirms that non-docile behaviour weakens the positive relationship between proactive traits — extraversion and OTE— and FSB. Findings show conditional moderation effects of highly docile behaviour on relationships between FSB and conscientiousness as well as FSB and agreeableness. Neuroticism did not influence FSB. Research finds significant positive relationship between docility and FSB which brings a new perspective to the current literature on both concepts. The findings benefit practitioners by gaining some knowledge about i) employees' preferable feedback-seeking strategy considering their average level of docility and personality, ii) ways to provide feedback, and iii) availability and allocation of resources to provide feedback.

To find the effects of organizational characteristics — namely formal and informal rules of interaction, costs imposed on seeking and sharing information, and range of interaction— on different types of docility, this study uses agent-based modelling (*ABM*). This study takes Simon's original model of docility, expands it, and applies it to individuals in formal and informal organizational environments. The reduced costs and flexible environment provided by high range of interactions are extremely significant in understanding how docility emerges and becomes a prevalent cognitive attitude.

Finally, from an academic viewpoint, I contribute to debates surrounding concept of docility and exploring antecedents of FSB.

Table of Contents

List of tables

List of figures

Acknowledgements

In the loving memory of Kehkashan Zia Mufti (1979-2010).

Declaration of Co-authorship

I hereby declare that this thesis incorporates material that is result of joint research, as follows:

This thesis incorporates guidance from Dr. Davide Secchi, Dr. Fabian Homberg and Dr. Jens Mohrenweiser, the authors' supervisors. The collaboration with supervisors including guidance on the literature review and techniques on data analysis. In general, they perform as a sounding board. In all cases, the key ideas, empirical designs, data analysis and interpretation were all carried out by the author.

I am aware of the Bournemouth University Policy on Authorship and I certify that I have properly acknowledged the contribution of other researchers to my thesis.

I certify that the research is the product of my own work.

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Mehwish Zia Mufti

Chapter 1: Introduction.

1.1 Research Background.

'Day to day' feedback-seeking happens naturally and continuously as part of the way employees interact with each other at work. Feedback-seeking refers to an employee's proactive socialization tactic that involves active inquiry about one's role requirements and performance to assess whether one's behaviours are effective to achieve valued end states (Ashford and Black 1996; Ashford and Cumming 1983; Ashford et al. 2003; Cooper-Thomas and Anderson 2006). Employees seek feedback either by being proactive or asking their supervisors or co-workers for feedback (called as inquiry) or by observing their surroundings and others for signs that might serve as feedback information (called as monitoring). Inquiry comprises of explicit verbal requests for feedback through direct (straightforward) or indirect (roundabout questions) methods. Monitoring involves paying attention to the aspects of the environment, particularly other people, that provide indications of how one is performing, how one compares to others (Festinger 1954) and how others react to one's work or behaviour and what other people think of oneself (Jones and Gerard 1967).

Following Ashford and Cumming's (1983) seminal work, studies concluded that proactive feedback-seeking is a vital resource of improving employee's performance (see reviews by Anseel et al. 2015; Ashford et al. 2003). This behaviour of feedback-seeking has a positive impact on work outcomes, together with greater employee self-awareness in the work context, better goal setting, and better performance (Ashford et al. 2003; Crommelinck and Anseel 2013; Dahling and Whitaker 2016; Long et al. 2017; Wu et al. 2014). In addition, feedback-seeking increases job satisfaction, citizenship behaviours, creativity, newcomer adjustment, and decreases turnover intentions (Bauer et al. 2007; De Stobbeleir et al. 2011; Morrison 1993; Renn and Fedor 2001; Whitaker et al. 2007). Employee who seek feedback signal their motivation to learn and improve their

performance (Ashford et al. 2003; Ashford and Tsui 1991). Given the importance of this proactive tactic of seeking feedback, stimulating and encouraging employee FSB has become progressively critical within organizations (see e.g., Janssen and Prins 2007; Qian et al. 2016; VandeWalle and Cummings 1997). It has become important to consider strategies that can motivate employees feedback-seeking. Given the benefits of feedback-seeking, researchers have investigated antecedents of FSB in attempt to identify ways of encouraging and promoting it in the workplace. Scholars have highlighted exploring psychological components of FSB as one of the strategies which indicate influence of positive psychological resources on feedback-seeking in the context of teamwork environments (like, Crant 2000; Dahling and Whitaker 2016; Krasman 2010; Tidwell and Sias 2005; Kammeyer-Mueller and Wanberg 2003; Yanfei et al. 2017). To be precise, feedback-seeking implies individual's personality, suggesting that personality traits, specifically, Costa and McCrae's Big Five affect different combinations of FSB (e.g. Krasman 2010; Tidwell and Sias 2005). The big five (henceforth, BiG5) allows the influence of the entire personality makeup on individual's seeking behaviour to be examined. A more feasible strategy for old timers is to consider their level of docility which can enhance their decisions to seek information in the form of feedback from the social channels (Simon 1990, 1993; Secchi 2011; Secchi and Bardone 2009).

The theory of docility offers an underexplored framework for investigating the personality-FSB relationship in employee feedback-seeking as a social proactive strategy. Docility defines human tendency to lean on information coming from (Simon 1990,1993) and to provide information to social channels (Secchi and Bardone 2009) which can assist completion of cognitive tasks, more specifically decision-making. The variations in an individual's docility, from docile to non-docile or vice versa, indicates that one's attitude towards a given social environment varies per situation and time (Secchi 2011).

Subsequently, it can influence the ways individual interacts with the environment and performs cognitive activities, most importantly decision-making. Each feedback-seeking strategy represents a decision that individual makes about how to get feedback information in a way that assists them in improving their performance. Therefore, individuals and organizations have much to gain from understanding role of docility in using socially obtained feedback for making decision which enhance performance. I chose to study feedback-seeking among existing employees because of observing elements of docility which are developed overtime, such as influence of knowledgeable people in social network and socially distributed decision-making (Secchi 2011; Bardone and Secchi 2017). This research highlights docility as a moderator of the relationship between personality and FSB. The potential role of docility as a moderator of the relationship between personality and FSB should be explored for following reasons.

First, docility defines individual's behavioural and cognitive disposition which assists (Bardone and Secchi 2017; Secchi 2011; Secchi and Bardone 2009) and explains (Knudsen 2003; York et al. 2013) effective decision-making strategies (e.g. Miller and Lin 2010) including decisions related to feedback-seeking. The relationship between docility and feedback-seeking has been overlooked even in extensive reviews of the literature on FSB (e.g. Anseel et al. 2015; Anseel et al. 2007; Ashford et al. 2003). Understanding the concept of docility and its contribution to the relationship between personality and FSB is therefore a topic in need of exploration.

Second, the current literature on docility itself faces lack of empirical data, research or scientific basis to support the concept as it has never been measured. It is only recently that the scale has been developed by Secchi (2017a). My study is the first attempt to use the scale and measure docility in relation with other concepts. Another reason of limited research in the field of docility is its association with theory of bounded rationality

(henceforth, BR). The theory of BR acknowledges that individuals have 1) limited access to external sources of information ─ anything outside the brain ─ which can influence decision-making, and 2) limited internal cognitive capabilities (computational skills of the brain) to perceive and control all the available variables (Simon 1955, 1997). These limitations make individuals to lean on external social sources providing additional information and assisting in manipulation of the information for optimal decision-making. Even when access of all the required external resources is made possible, the internal cognitive limitations are unable to process the information received to make optimal decision, which defines human cognition as entirely bounded in internal computational limits (Simon 1979). In short, BR is the reason why individuals tend to depend on information coming from people in the social system during decision-making process (Simon 1990, 1993), making them docile. Whereas, BR has never addressed any concept of "socially" based rationality (Secchi 2011) or human's "distributed" rationality or cognition (Hutchins 1995). Hence, been criticized for considering the subject of rationality at a purely technical level (Murphy 1992) disregarding how individuals exploit the social environment (Chase et al. 1998). To be precise, the theory of docility lacked strong social cognitive basis and comprehensiveness (Secchi 2011) which restricted researchers to explore it in organizational or behavioural studies. Hence, the weaker ties with BR restricted research on investigating role of docility in completing any cognitive tasks.

Third, literature remains unclear about the organizational factors which can make individual docility to emerge, stabilize or impede. Once the favourable conditions are known, organizations can plan and implement formal or informal mechanisms to encourage docile behaviour. Similarly, if the unfavourable conditions are known, organizations can plan and put in place some formal rules and informal norms to

discourage non-docile behaviour. This thesis is one of very few attempts to refine and operationalize the concept of docility supported by empirical tests and dynamic model of docility.

To address these shortcomings, aims of this thesis are (i) to review and refine the theory of docility, ii) to extend the concept of docility by relating it to feedback-seeking, (iii) to review and hypothesize the influence of BiG5 personality traits on FSB, followed by hypothesizing moderating effect of docility on the relationship, (iv) to validate the scale to measure docility for the first time, (v) to design a quantitative study to measure docility and build empirical evidence on the effect of docility on the relationship between BiG5 personality traits and FSB, (vi) to extend the theory of docility by defining different types of docility and simulating the effects of organizational characteristics ─namely formal and informal organizational structure, cost of seeking information, cost of sharing information, range of interaction─ on emergence of different types of docility and , (vii) to analyse the simulation to find evidence on the emergence of different types of docility under the effect of above mentioned organizational characteristics.

The importance of this research relates to (i) theorizing and analyzing potential impact of docility on the relationship between personality and FSB. In doing so, the study broadens the scope of the antecedents of FSB to understand better how and when this behaviour emerges and how to improve it. Hence, it provides an effective theoretical basis for conducting more comprehensive empirical study to analyse complex routine feedback-seeking problems more truly and accurately. The study contributes to (ii) measure concept of docility for the first time by validating a newly developed tool by Secchi (2017a). The study also contributes by (ii) theorizing, simulating and analyzing the organizational attributes which can influence the emergence of docility within formal and informal

environments. In addition, the study distinguishes between different types of docility which can emerge within organizational environments.

1.2 Research questions.

The study answers following questions which are not addressed by the current literature.

1) Does docility influence the relationship between FSB and individual personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism and OTE)?

2) Do different organizational attributes (formal and informal organizational structure, cost of seeking information, cost of sharing information, range of interaction) influence emergence of different types of docility?

Based on these two questions, the following research objectives are outlined:

(1) To validate and use the newly developed scale to measure docility for the first time.

(2) To estimate whether docility moderates the relationship between personality and FSB.

(3) To explain different types of docility.

(4) To assess if organizational characteristics — namely organizational structure (formal or informal), costs of seeking information, cost of sharing information, and range of interaction— influence different types of docility to emerge.

1.3 Significance of the study.

This study adds to both research on the contextual factors as antecedents of feedback-seeking (e.g., Krasman 2010; Whitaker et al. 2007) and the docility literature on finding individual and organizational factors which can influence its emergence (e.g. Secchi 2016; Bardone and Secchi 2017). It is significant to academics, practitioners and

organizations trying to recognize the antecedents contributing to docility and feedback-seeking as well as uncovering the organizational factors which can influence docility. The study has following theoretical and practical contributions.

1.3.1 Theoretical contribution.

The defined aims and objectives of the research indicate towards five major theoretical contributions of this study.

First, the research provides literature review on docility and presents arguments on the underpinning theories of distributed cognition and bounded rationality. The current literature on docility is mainly based on theoretical grounds and simulation-based studies. The study provides empirical evidence on the effect of docility with respect to the relations between individual personality and feedback-seeking. This extends and builds empirical knowledge in the field of docility by allowing identification and assistance in explaining the effects of docility in reality. An investigation of these relationships is likely to advance researchers' understanding the choice of feedback-seeking strategies and the consequences of employees' docility and personality.

Second, the study also contributes towards the literature on feedback-seeking. It tests the influence of individual factors on different strategies of feedback-seeking. The findings build empirical knowledge about the effect of different personality traits on individual feedback-seeking strategies. In addition, the findings broaden the knowledge on the antecedents of feedback-seeking and prompts more academic interest to explore other individual and organizational factors contributing to FSB. The thesis dedicates most of the sections of chapter 2 on describing the concepts and presenting theoretical model hypothesizing the relationships between them. The thesis presents empirical evidence, in chapter 4, on the hypothesized effect of docility on the relationship between BiG5 personality traits and dimensions of FSB.

Third, the study is the first of its kind which measures individual docility by using newly developed scale by Secchi (2017a). The study provides details on validation of the scale in Chapter 4. Using and presenting results of a newly developed validated scale is likely to encourage researchers in the field to further investigate the concept by exploring its antecedents and its effects on other individual or organizational concepts. This will build nomological network through future empirical works. Thus, academics have more opportunities to gain a more comprehensive view on the role docility plays in day to day completion of cognitive activities.

Fourth, the research explains and provides knowledge about different types of docility and uncovers the organizational factors — namely organizational structure, costs of seeking, cost of sharing, and range of interaction— which can influence emergence of docility. Chapter 5 is dedicated to exploring the organizational factors which can play some role in emergence of docility. The chapter looks at these factors as affecting the main preconditions or fundamentals of docility to emerge (i.e. individual being part of a community, following set standards to exchange information, and ensuring public availability of information). These preconditions are discussed as fundamentals of docility in chapter 2 (section 2.4.5). The research uses ABM and highlights its use to build emerging concepts of organizational theory (e.g., Cristina et al. 2017; Herath et al. 2017; Secchi and Neumann 2016). The philosophy of using ABM and its use is explained as part of chapter on methodology (chapter 3) as well as in simulation-based research (chapter 5). The findings from the simulation highlight the conditions which are favourable and unfavourable for docility to emerge.

Fifth, chapter 5 provides detailed information about the types of docility and presents them on the basis of new attributes. More importantly, it presents human's docile behaviour which has characteristics of selfishness instead of altruism (below-average

docile: who takes information from others and does not give anything in return). Knowledge about the characteristics of different types of docile behaviour can give some indication towards the influence of particular type of docility on other individual factors. The following section provides details on practical contributions of the study.

1.3.2 Practical contribution of the study.

Findings of both empirical studies (chapter 4 and 5) have following six practical implications for supervisors/managers and decision-makers within organizations.

First, the study provides information about role of docility in completion of cognitive tasks, especially decision-making within organizational environment. In addition, the study highlights that organizations need to spend some time in understanding aspects of distributed cognition and how these can influence social distribution of cognitive resources.

Second, the study gives some knowledge about the characteristics of individuals, through examining personality and docile behaviour, who prefer specific feedback-seeking. Study emphasises that one policy for everyone won't work when it comes to FSB. Organizations need to understand individual's preferences for feedback-seeking strategies and the reasons behind those preferences in order to make the resources available as well as encouraging and promoting FSB.

Third, the study suggests that managers should consider personality and individuals' docile behaviour if they are looking to hire proactive feedback-seekers and highly cooperative team members for their projects. This could be examined during interviews and preliminary screening or during probation period. In a nutshell, the research provides details about the antecedents of FSB which can guide supervisors/managers to establish facilitating mechanisms at the organizational level in the form of informal norms and

formal rules to support and foster the emergence of docile behaviour and encourage feedback-seeking.

Fourth, the study creates an opportunity to bridge practitioners and academics understanding of docility. Previous studies on docility are mainly based on simulation-based research. Those studies have assisted in developing the theory, but it is challenging for academics to systematically understand docility. The use of scale can be applied to compliment the traditional method practitioners rely on. Hence, it creates a communication channel between practitioners and academics and increases the applications of works in both fields.

Fifth, assessing the effects of organizational factors ─ namely formal and informal structures, cost of seeking, cost of sharing, and range of interactions ─ on emergence of docility through simulation could assist supervisors/managers to consider them when developing policies, planning, designing, and establishing organizational environment.

Sixth, findings from the ABM show significant increase in numbers of non-docile behaviour whenever information exchange and provision of flexible environment were discouraged by organization. Hence, it is an indication to supervisors/managers to avoid certain conditions which can cause blockage of information exchange and non-cooperative behaviour because of popularity of non-docile behaviour.

1.4 Structure of the thesis.

This thesis is composed of six chapters. Each of the chapters are summarized here. *Chapter 2* reviews the current literature on feedback-seeking, personality and docility. The main discussion is around docility as outlined by different scholars on different theories. A conceptual model is developed from existing literature suggesting that BiG5 personality traits influence individual's decisions about FSB and docility is hypothesized to moderate this relationship.

Chapter 3 focuses on the choice of philosophical paradigm and research design. It provides justification for all methodological decisions undertaken that guided the following studies in chapter 4 (empirical test of theoretical model) and chapter 5 (use of ABM to find organizational characteristics affecting emergence of docility). The chapter provides some explanation on decisions taken on research philosophy, research approach, strategies, specific data collection methods, techniques and procedures i.e., research sampling and data analysis techniques. The chapter discusses measures of main variables which are further described in chapter 4 for the empirical part of research. The chapter highlights the philosophy of ABM and its use in organizational studies. Finally, the chapter acknowledges the limitations and ethical issues of the research.

Chapter 4 empirically studies the relationship between BiG5 personality traits and feedback-seeking strategies. This is followed by assessing how docility affects this relationship. The analysis is conducted by using a sample of 408 observations. The results confirm that BiG5 traits except neuroticism influence feedback-seeking strategies. The research confirms that high level of docility weakens the positive relationship between FSB and extraversion. Similar results confirm that low level of docility (non-docile behaviour) weakens the positive relationship between FSB and OTE. Research has found significant moderation effects on relationship between FSB and conscientiousness as well as neuroticism. Research finds significant positive relationship between docility and all dimensions of FSB which brings a new perspective to the current literature on docility and FSB. The chapter provides detailed discussion on the results as well as provides discussion with regression tables of non-hypothesized relationships which makes it more informative.

Chapter 5 presents concepts around organizational factors — namely formal and informal structures, cost of seeking, cost of sharing, and range of interactions — influencing the

fundamentals of docility causing variation in emergence of different types of docility. The chapter features development and testing of the ABM in Netlogo program. The ABM assists in exploring the conditions which promote or impede different types of docility ─ including non-docile, average docile, below average docile and highly docile ─ within organizations. The model simulates different types of docility as heterogeneous agents defined based on different attributes. The analysis is carried out through co-plots and t-tests carried out in R-Studio. Discussion of the findings and contributions conclude the chapter.

Chapter 6 provides a summary of discussion on the findings of both the studies as presented in chapter 4 and 5. It proposes the implications of the studies towards academics and industries. It identifies that the research is clearly leaning towards cross-disciplinary research. In fact, it can be used by researchers in the fields of cognition, organizational behaviour, psychology, and computer simulation.

Literature review contributes towards developing a conceptual framework which further guides the first ever empirical study measuring docility. The methodological aspects of conducting quantitative research are discussed followed by empirical testing. Findings from the empirical analysis provide evidence on the hypothesized relationships. The survey-based study presents relationships which provide in-depth information on influence of individual's personality and level of docility on their choice of feedback-seeking strategies. The results of the study have a potential to build knowledge on individual's FSB at workplace which can assist supervisors to devise programs to improve and encourage it, consequently improving performance. This information can allow supervisors to allocate resources for their employees FSB as per their personality and average level of docility for their daily tasks.

Findings from the simulation-based research identify the organizational factors which can

influence emergence of different types of docility. This research guides organizations in considering influence of implementing different costs on seeking and sharing information, defining range of interactions, and rules of interactions (as per formal and informal organizational structures) on employee's docile behaviour. Being a social exchange mechanism, docility requires interaction with maximum numbers of social channels for information exchange. So, if there are restrictions on number of interactions due to imposing high costs of sharing information or limiting number of social channels then the organization is discouraging docility. Knowledge about the organizational factors which encourage docility can help organizations to introduce mechanisms in the form of formal rules and informal norms to maintain the favourable conditions within organization. Findings also assist organizations to identify mechanisms in the form of informal norms or formal rules which are focused to avoid the occurrence of non-docile behaviours which lead to ineffective and unproductive decisions. The chapter concludes the thesis with limitations and recommendations for future research.

The next chapter defines the main concepts of this research. First it explains FSB and its dimensions. Followed by discussion on personality traits and development of hypotheses focusing on the relationship between personality and FSB. The chapter discusses docility as outlined by different scholars based on different theories. A conceptual model is developed from existing literature suggesting that docility moderates the relationship between BiG5 personality traits and FSB.

Chapter 2: Exploring the Psychological and Cognitive Backbone of Feedback-seeking Behaviour: A theoretical framework. [1]

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2.1 Introduction.

The previous chapter presented an outline of the thesis. This chapter first reviews the literature related to feedback-seeking, personality and docility. It presents hypotheses based on the theoretical deductions on the relationship between BiG5 personality traits and feedback-seeking strategies. Second, after a detailed review of the concept of docility, it presents hypotheses related to docility moderating the relationship between BiG5 personality traits and feedback-seeking strategies. The conceptual framework is a foundation for the empirical study presented in chapter 4.

2.2 Theoretical overview of Feedback-seeking Behaviour.

Feedback is a multidimensional term in psychology, organizational behaviour, and other social sciences. Early empirical research in psychology showed that feedback significantly influenced performance and motivation (Ammons 1956). Closer analysis reveals two principal research camps that study feedback. One looks at feedback as an organizational resource (Ilgen et al. 1979), addressing such subjects as incentives (Ganzach 1994) and interventions (Kluger and DeNisi 1996). The other camp looks at feedback from the perspective of the employees engaged in the behaviour being evaluated (Ashford and Cummings 1983; Anseel et al. 2015) and recognizes them as proactive in gaining information valuable for self-assessment and learning (Sedikides 1993; Sparr et al. 2017). This research is from the second camp and looks at FSB as an employee's solicitation of "information" from their supervisor or co-workers about how he or she is performing. Feedback can provide information about the correctness, accuracy, and adequacy of work behaviour. Before going into the details of FSB, here is a brief overview of what "information" means in this line of research followed by another subsection on understanding of motives and patterns of FSB.

2.2.1 Defining information.

Information being a polysemous word is a center of debate amongst scholars as many have struggled to come up with a formulation that potentially recapitulates most of the meanings into one universal attribute (Case 2012). In general, the word "information" is often confused with "data" and "knowledge". Machlup (1983) examined the issue and pointed out that data is a "raw" type of information whereas, information is the "processed data". Machlup (1983: 644) further clarified that "information is acquired by being told, whereas knowledge can be acquired by thinking".

The word 'information' is derived from the Latin verb 'informare' and Latin noun 'informatio' which link back to Greek notions 'morphe', which means 'shape or form'. The verb 'informare' hence means 'to shape something' and 'to design or form something'. This further clarifies that information is something which is processed, unlike raw like data. The described meanings of 'information' seem to be very interesting especially from a distributed cognition perspective. Distributed cognition approach (henceforth, DCA) emphasizes on the external delegation of some cognitive activities, so that the cognitive system is "distributed" through the process of externalization (Hutchins 1991, 1995). Externalization refers to the reproduction of internal information (thoughts, ideas, plans, etc.) to external resources so that the knowledge and cognition is distributed across objects, artefacts and tools in the environment and not solely within one's head (Hutchins 1991, 1995). The DCA is based on the idea that external resources shape individual's cognitive system.

It seems that socially distributed information is not only something which is shaped or designed but also something which can further shape or redesign other things, specifically individual cognition through a smart interplay. Where docility is a mechanism which allows the shaping of individual cognition using socially obtained information

17

(henceforth, SOI) as well as shaping and redesigning new information. Similarly, information can be a message communicated in some form of medium, and/or carrying a potential of modifying a person's cognizance (Case 2012) and "….is produced in a social context" (Tuominen and Savolainen 1997: 89). For example, a research paper is an instance of information as it contains text, symbols, tables, and graphs intended to inform others (intention to share makes it a social resource). Here the thing or object (i.e. research paper) acts as a form of information with a feature of imparting knowledge (Buckland 1991).

This research has used terms "data" and "information" interchangeably as there is no clear definition in studies of information behaviour as well as docility. Literature tends to define information per its location, i.e. whether it is present inside the human brain (internal information) or outside (external information) or in between the both (sense-making information, Dervin 1976). If it is inside the brain it is subjective and defines cognitive map of reality (Dervin 1977) and becomes part of individual internal cognitive resources (Bardone and Secchi 2009), which are transformed and organized for use by human system (Ruben 1992) through manipulation from the external world. Whereas, when it is found outside the brain in the environment as an entity (Ruben 1992) including human beings (Magnani 2007) then it can be part of external cognitive resources (Clark and Chalmers 1998), which has limited ability to define reality (Dervin 1977) but can influence the cognitive activities (Clark and Chalmers 1998) through a dynamic interplay. This smart interplay between the internal and external cognitive resources shape each other making it difficult to differentiate between the actual locations of the information. Hence, there is no clear distinction between internal and external cognitive resources. Similarly, there are no boundaries of rationality as it is socially distributed. Individuals use several procedures and behaviour such as docility (Secchi 2007; Bardone and Secchi

2009) which allow moving between both types of information to understand the environment through a smart interplay (Clark and Chalmers 1998).

2.2.2 The Proactive FSB.

Defined as a 'conscious devotion of effort towards determining the correctness and adequacy of behaviours for attaining valued end state' (Ashford 1986: 466), FSB is instrumental proactive behaviour for work adjustment, mainly in contexts where uncertainty and ambiguity prevail (Ashford and Tsui 1991; Morrison 1993). Information provided as feedback is an important individual resource (Ashford 1986), since it indicates how others evaluate one's own behaviour (Kuchinke 2000); it assists to identify effective behaviours and to find ineffective behaviours (Ashford and Cummings 1985). Example of FSB is an employee asking a supervisor, "how am I doing?", or "have I completed the task correctly?" This line of research depicts feedback-seeking as a valuable resource for individuals because it may facilitate their adaptation to new environment, support them to monitor goal progress, and possibly improve performance (Ashford et al. 2003). There are two main features of FSB. First is that of being proactive while seeking feedback about one's performance, and second refers to informal day-to-day feedback information. Proactive search for feedback-seeking is an original assumption that started feedback-seeking research (Ashford and Cummings 1983); employees do not wait for feedback to be given but, in the absence of feedback, will take initiative in seeking feedback through inquiring and monitoring, to achieve their performance goals. Proactive search is important as passively waiting to get this information from supervisors or co-workers can be ineffective (Krasman 2012). For example, there is a possibility of supervisors not knowing the exact moment when their subordinates need feedback for their work (Dobbins et al. 1990). Even if they approach their subordinates for feedback, they can be hesitant to give a feedback which is negative

(Fisher 1979). As the type of feedback received can have influence on future feedback-seeking decisions (Anseel et al. 2015; Anseel 2017); supervisors can even distort the message to make it look positive, or even postpone or refrain to provide feedback. The second distinctive component of FSB is that it refers to informal – that is, day-to-day – feedback information. This contrasts with formal feedback which is usually received during performance appraisals, for example. However, feedback researchers have realized that employees often seek feedback for multiple reasons. The proactive and informal feedback-seeking is mainly inspired by three primary motives which are described below.

2.2.3 Motives of FSB.

Researchers (Ashford and Cummings 1983; Ashford and Tsui 1991; Morrison and Bies 1991) have suggested that three separate kinds of motives may be associated with feedback-seeking:

- *Instrumental or the performance-related motive*: It is more prevalent and important for employees as it has informational value that assists in achieving goal and reducing uncertainty (Ashford and Cummings 1983).

- *Impression management motives or the image-related motive*: It is concerned with FSB motivated to protect or enhance the impression that others hold of one in organizations (Morrison and Bies 1991).

- *Ego-based motives:* Unlike other motives, this encourages FSB intended to strengthen the ego and avoid feedback that might threaten the ego (Northcraft and Ashford 1990). Performance-related motives involve a rational desire to gain useful information to accomplish tasks effectively and enhance performance. This kind of motive includes important elements: (i) information gathering about individual's work role and (ii) choosing strategies that favor the acquisition of feedback that add informational value

(Ashford et al. 2003; Ashford and Tsui 1991; Crant 2000). Behaviours attributed to impression-related motives may be devalued by supervisors, whereas performance-related motives are likely to influence performance judgements (Eastman 1994; Schlenker 1980). Evidence shows that as the perceived value of feedback increases, employees tend to seek it actively and more frequently (Ashford 1986; Morrison 1993; Tuckey et al. 2002). Therefore, this research looks at the performance-related motive behind feedback-seeking as it targets to improve individual's performance and has a positive influence on performance judgements (Ashford et al. 2003; Ashford and Cummings 1983; Ashford and Tsui 1991; Eastman 1994; Long et al. 2017; Schlenker 1980; VandeWalle et al. 2000).

Feedback has particularly high instrumental value under uncertain situations and that is when people seek more feedback. For example, newcomers within organization need to "learn the ropes" and information from feedback is specifically valuable to foster their adaptation (Ashford 1986; Ashford and Cummings 1985; Callister et al. 1999; Miller and Jablin 1991; Morrison 1993). The information gained from feedback decreases uncertainty regarding both one's job roles and the performance contingencies in the organizational environment. As they become more adapted, the frequency of feedback-seeking decreases (Ashford and Cummings 1985; Callister et al. 1999). The strategies which assist in acquisition of feedback which improves informational value are discussed below as patterns of FSB.

2.2.4 Patterns of FSB.

Ashford and Cummings (1983) emphasized several aspects of the patterns of feedback-seeking that warrant theory and research. In a review, Ashford et al. (2003) and Anseel (2017) identified five key patterns of FSB including: frequency, strategy, timing, source, and type of feedback information. These are discussed below. Each of these feedback-

seeking patterns represents a decision that individuals make about how to get feedback information from specific source in a way that assists them in achieving their goals.

2.2.4.1 Frequency.

Frequency defines how often an individual engages in feedback-seeking. Research looks at the psychological, cognitive, behavioural and contextual factors that influence this frequency.

2.2.4.2 Method or strategy.

It is a prominent pattern as it identifies whether individual has sought feedback through inquiry or monitoring. Inquiry comprises explicit verbal requests for feedback which can be direct or indirect. In a direct inquiry, an individual asks the source for feedback in a straightforward manner. For example, a worker may ask his supervisor, "What do you think of my marketing plan?" The strategy is made public and the feedback is preferred to be made explicit.

Indirect inquiry refers to asking for feedback surreptitiously, either by using hinting, joking, or roundabout questions (Miller and Jablin 1991). For example, a worker may ask his supervisor, "I wonder what I could have done differently or better?" The feedback is sought in a private manner, not in front of anyone else, whereas the feedback given is implicit in nature.

Monitoring involves paying attention to the aspects of the environment, particularly other people, who provide indications of how one is performing, how one compares to others (Festinger 1954) and how others react to one's work or behaviour and what other people think of oneself (Jones and Gerard 1967). For example, a pat on shoulder, an invitation to have coffee together, or something like 'thumbs up'. From these observations, the individual privately gathers information as feedback. One major difference between these strategies is that direct and indirect inquiry are verbal, whereas monitoring (called also

reflective appraisal) is observational. Information received through verbal communication would be considered richer than information received in writing because of the added meaning transmitted from tone, body language as well as the interpretation of the messenger. Verbal communication has "social presence" (sociability, personality, warmth and sensitivity) which affects the degree to which information seekers and providers (communicators) perceive each other to be psychologically present when interacting.

2.2.4.3 Target or source.

This dimension defines the source from whom or which an individual seeks feedback from. For example, in some organizations, an individual may seek feedback from supervisors, co-workers, customers, documentation (memos and manuals), and subordinates (Ashford 1993; Ashford and Tsui 1991). As previous studies have shown, organizational peers serve as guides for employee decision-making (Schein 1984), they establish standards and serve as the referents for behaviour within organizations (Jones and Kavanagh 1996). Based on the idea of looking at the influence of social information sources on decision-making, this research has considered feedback-seeking from social cognitive sources only: supervisors and co-workers. In direct inquiry the source is aware of them being sought for feedback, whereas in indirect and reflective appraisal the source doesn't know that they are being sought for feedback as there is no interpersonal interaction.

2.2.4.4 Timing.

This pattern defines when exactly an individual seeks feedback. Is it immediately following performance of a task or does it come after a delay? (Larson 1989). The choice of timing can be based on both informational needs, strategic and reputational concerns.

2.2.4.5 Type or topic of feedback information.

This dimension identifies the topic on which feedback is sought from the source. Employees can sometimes decide to focus their feedback-seeking to gain information on a topic over another, and within that topic they can try to gather more negative or positive feedback (Ashford and Tsui 1991). As mentioned earlier, this research has focused on individual's search for performance feedback, that is, evaluative information about the accuracy of their work outcome and work methods (Earley et al. 1990). There are two components of performance feedback:

    i)   Outcome feedback, or information concerning performance outcome and

    ii)   Process feedback, or information concerning the methods/ways an individual implement to work.

This research aims to examine the influence of personality traits on the frequency of seeking performance feedback and role of docility on this relationship. From this description, it is obvious that each instance of FSB combines several dimensions: a source, a strategy, frequency, and type of information (one of the components of performance feedback). The next section describes five core personality dimensions (Costa and McCrae 1992) leading to developing hypothesis about their influence on FSB.

2.3 Theoretical overview of Big Five Personality Traits.

As the current study explores the reasons of variability and patterns in individual FSB, I must identify and understand individual's psychological characteristics as seeking behaviour evolves from the interaction between the two. Where personality is a very important psychological mechanism that guides behaviour where every person has distinctive personality traits (Feist and Feist 2009) which leads to different behaviour at work. As we know that totality of an individual's behaviour and emotional characteristics make up their personality traits (Jordan 2011), it assists in describing a person's moods,

sentiments, opinions, attitudes, motivations, and style of thinking, understanding, perceiving, speaking, and acting. It is part of what makes an individual different from others.

Theorists have approached this global concept of personality from different perspectives and have not agreed on a single definition of personality. However, Feist and Feist (2009) gave a definition that is mostly acceptable by personality theorists. Personality is found as a pattern of relatively permanent traits and unique characteristics that give both consistency and individuality to a person's behaviour (Feist and Feist 2009). While individual's characteristics are unique qualities of an individual that include attributes such as intellect, temper, and build (Feist and Feist 2009). As mentioned earlier, research devoted to the development of a taxonomy of personality traits has identified five broad and core dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and OTE (McCrae and Costa 1997). It is important to note that the five dimensions describe continua between two extreme poles. The extraversion dimension is, for instance, constituted by the two poles of extraversion and introversion. Everyone tends to be inclined towards characteristics of either side of this dimension, being either more outgoing or reserved.

Even though there is disagreement over the comprehensiveness of the five factors (Schneider and Hough 1995), the five-factor model is nonetheless recognized as a strongly robust and useful means to describe individual personality (Mount et al. 1998). That is one of the reasons five-factor model is widely used and cited in organizational behaviour research (Zhou and George 2001). In addition, these BiG5 traits tend to remain relatively stable during adulthood (Digman 1990; Revelle and Loftus 1992), situations, and contexts (Weaver 1998) which makes them appropriate for describing differences in individual cognitive abilities, emotions and social behaviour (Back and Seaker 2004;

Barrick et al. 2001). Nevertheless, as Costa and McCrae note, "nothing in life is permanent, however. Although the rate of change in personality apparently does not change after age 30, small changes do accumulate over the life span" (Costa and McCrae 1994: 146).

In feedback-seeking process, personality traits are likely to influence the attitudes and behaviour of the feedback seeker (Krasman 2010). There exists a sturdy relation between individual personality and FSB, as the motivation for feedback, strategies of feedback-seeking and the nature of cognitive, affective and social utilization of information are formulated by the interaction of the inner traits and personality dimensions of the feedback seekers. However, the main effects have been found to be inconsistent across limited studies (cf. Anseel et al. 2015; Tidwell and Sias 2005; Krasman 2010). As mentioned in introduction, this inconsistency indicates possibility that there are other cognitive and psychological factors that moderate the effects of individual personality on their choice of feedback-seeking strategy (direct, indirect, or reflective appraisal), preference for source of information (supervisor or co-worker), how they want the information to be exchanged (public or private), and whether feedback is given in the form of explicit or implicit information.

The following sections explain BiG5 personality traits and how they influence choice of feedback-seeking strategies. The conceptual model posits that individual personality plays vital role in choosing feedback-seeking strategies which further defines their FSB. By doing this, the research provides a conceptual framework to better understand and analyse the social nature of feedback-seeking. Within an organizational setting, the recognition of individual personality may assist in arriving at some generalization regarding the nature of feedback seekers and to find the possible variables which are the basis or contributors of such individual's differences in feedback-seeking.

This is followed by a thorough review of docility and its influence on the hypothesized relationships between BiG5 personality traits and FSB dimensions.

2.3.1 Extraversion.

Extraversion is characterized by higher sociability and disposition towards others (McCrae and Costa 1997). It signifies individuals' tendency to be sociable, expressive, enthusiastic, confident, and active (Costa and McCrae 1992; Costa et al. 2001). All these attributes make highly extravert individuals, open and proactive communicators (Weaver 1998) who are looking for interpersonal social interaction. Highly extraverts tend to look for social stimulation and opportunities to engage with others. These individuals are often defined as being full of life, energy and positivity. In group situations, extraverts (also known as extroverts) are likely to talk often and assert themselves. Introverts on the other hand are quiet, reserved, unsociable, and shy (Costa and McCrae 1992). They prefer to be alone. Introverts are usually more stimulated than extraverts. Therefore, extraverts are inclined to seek stimuli from their environment through social interactions, which increases their arousal level (Revelle 1993). Previous studies didn't find any significant relation between extraversion and individual's information-seeking from social channels in a working environment (e.g. Tidwell and Sias 2005).

Given the nature of extraverts to look out for social experiences and ambitiousness, people high on extraversion should be more likely to seek feedback through more social strategies i.e. verbal approaches (direct and indirect methods: Krasman 2010) rather than observational (reflective appraisal: Wanberg and Kammeyer-Mueller 2000). As highly extraverts show high level of confidence and high tendency to seek stimulation through risks (Furnham 2012) which can come across by receiving unexpected feedback from higher authority or feedback asking for novelty, variety and change in work performance.

Hence, it is hypothesized that highly extraverts will seek feedback from their supervisors more than their co-workers and prefer direct feedback-seeking strategies over the rest.

Hypothesis 1a. *Extraversion positively affects individual's direct feedback-seeking from supervisor.*

2.3.2 Agreeableness.

Agreeableness includes more humane aspects of personality (Digman 1990) as it clusters trust, straightforwardness, warmth, altruism, compliance, and modesty (Costa and McCrae 1992; Piedmont 1998). These characterizations lead to a pro-social behaviour at work including activities such as helping co-workers (e.g. Van Dyne and LePine 1998) and constructive voicing of opinions (e.g. Hagedoorn et al. 1999). Highly agreeable people tend to be good team members (Peeters et al. 2006) and cooperative. They are warm and sympathetic. They provide emotional support to their colleagues leading to develop social relationships at work (Saksvik and Hetland 2009) which are utilized for active information exchange. While, low level of agreeableness (i.e. competitiveness) is shown to be related to experiencing lack of time as a barrier to information-seeking and critical analysis of information (Heinström 2003). The lack of time devotion for information-seeking comes from individual's impatience which is one of the facets of competitiveness (Costa and McCrae 1992).

Individuals' pro-social behaviour (altruism) allows them to be open to others, which turn out to be an important feature or trait related to how individuals overcome their various cognitive limitations to make decisions (Bardone 2011). Furthermore, trustworthiness or credibility is an antecedent of feedback-seeking (Fedor et al. 1992; Ilgen et al. 1979). The more the trust, the more significantly one is inclined towards using the information coming from the social source (Ossola 2013) and is willing to use (McAllister 1995) and be influenced by the information received (Gino and Schweitzer 2008; Sniezek and Van

Swol 2001). This form of trust creates positive employee-supervisor exchange relationship which can evoke psychological safety and emotional support in employee (Hsieh and Huang 2018). In addition, it is apparent from highly agreeable individuals' tendency to be altruistic and have active interactions with others that they will not only provide but also seek and use information from social channels. Their proactive behaviour seems to allow them to use social interaction for feedback-seeking, i.e. verbal (direct and indirect inquiry) rather than observational methods (reflective appraisal).

Moreover, straightforwardness as a sub trait tends to allow highly agreeable individuals to sought feedback through straightforward questions (direct strategy) and expect explicit feedback. Explicit feedback tends to assist highly agreeable individuals in avoiding controversy and conflict which leads them to have positive interactions (Wanberg and Kammeyer-Mueller 2000). Looking at other characteristics of highly agreeable individuals' − such as, compliance and honesty wrapped in trust, altruism and conflict avoidance − suggests that they are disposed to seek feedback through direct inquiry methods from supervisors more than co-workers.

Hypothesis 2a: *Agreeableness positively affects individual's direct feedback-seeking from supervisor.*

2.3.3 Conscientiousness.

Conscientiousness is related to "socially prescribed impulse control that facilitates task- and goal-directed behaviour" (John and Srivastava 1999:121). Conscientiousness includes aspects that are related to diligence, willingness to achieve, self-motivation, perseverance, and self-discipline (Barrick and Mount 1991; Costa and McCrae 1992; Smith 1967). Individuals who are high on conscientiousness have a strong sense of purpose and will, are dependable and reliable, work hard to achieve their goals, are detail oriented, meticulous, organized, and tend to plan thoroughly (Anderson et al. 2008;

Barrick et al. 1993; Heinström et al. 2014; Jensen-Campbell et al. 2002; Karim et al. 2009; Wanberg and Kammeyer-Mueller 2000). It is expected that they tend to rely on the strategies that facilitate organization and careful planning. While, easy-going individuals with low level of conscientiousness prefer easily accessible information which requires minimum effort and thoroughness (Heinström 2003). Low conscientiousness can easily distract individuals from their tasks. They do not plan and avoid seeking thought provoking information. They put least effort in seeking information, hence rely on quick answers.

All above mentioned features motivate highly conscientious individuals to use more feedback (Rogelberg 2007). As highly conscientious individuals are interested in high job performance and goal achievement; they should place premium on seeking direct feedback from supervisor as they can provide most accurate and explicit information (Ashford and Cummings 1983; Krasman 2010).

On the other hand, highly conscientious individuals are somewhat conservative and rule-bound (Murphy 1996), excessively meticulous, and orderly (Costa and McCrae 1992). The prosocial aspect of conscientiousness (i.e. dependability) tend to have a high need for order and would be unlikely to do anything without being cautious which might result in a certain degree of inflexibility (LePine 2003). In addition, highly conscientious individuals fail to demonstrate interpersonal adaptability (Pulakos et al. 2000) resulting in avoiding delegations of their cognitive functions or tasks to others. Therefore, limiting their social cognitive resources. Hence, high conscientiousness decreases preference for deducing day-to-day informal feedback through not only indirect and reflective appraisal (Krasman 2010; Tidwell and Sias 2005) but also through direct inquiry.

Hypothesis 3a: *Conscientiousness negatively affects individual's direct feedback-seeking from supervisors.*

2.3.4 Neuroticism.

Neuroticism is an emotional factor which is often related with the sense of being depressed, angry, anxious, discouraged, vulnerable, emotional and insecure (Costa and McCrea 1992; Judge et al. 2002; Thompson 2008). Highly neurotic individuals are more worried, temperamental, and prone to sadness, apprehensive, self-conscious, impulsive, frustrated and full of negative emotions (Costa and McCrea 1992; Howard and Howard 1995; Piedmont 1998; Weaver 1998). In contrast, individuals who score low in neuroticism tend to be more emotionally stable and less sensitive to stress. They tend to be calm and less likely to feel anxious or rattled.

Research has indicated that individuals with high neuroticism are more disposed to experiencing uncertainty (Gunthert et al. 1999) and role ambiguities (Organ 1975). Where feedback comprising of clarifying information tends to reduce uncertainty about individual's work. However, the attributes associated with neuroticism may influence the purpose and choice of feedback-seeking strategies. For example, Fredrickson (1998, 2001) and Fredrickson and Branigan (2005) in their studies pointed out that the sub traits which trigger high neuroticism could narrow a person's thought-action repertories by influencing the mind to act in a specific way for self-protection and survival only. Hence, it can be concluded that they seek more feedback to secure their position at work rather than achieving the organizational goals. Individuals who are high on neuroticism (lower in emotional stability) tend to interpret ambiguous situations in a negative manner and are less likely to cope successfully with stressful situations (Wanberg and Kammeyer-Mueller 2000), they are likely to prefer tactics that provide them with social support and thorough feedback. Along these lines, it is expected that they prefer direct inquiry methods from supervisors and co-workers.

A similar position was advocated by Krasman (2010), who found that high neuroticism

increased feedback-seeking through direct and indirect inquiry from co-workers and indirect inquiry from supervisors. Though, Weaver (1998) found those high in neuroticism report being imperceptive, apprehensive and frustrated when faced interpersonal interaction. Similarly, considering other effects of emotional instability, such as, high resistance towards new information (Miculincer 1997) and low participation in any organizational activity (Bolger and Zuckerman 1995; McCrae and Costa 1997) seems to make highly neurotic individual to avoid interpersonal interactions (Weaver 1998). Hence, high neuroticism seems to create a negative relationship with interpersonal interactions (Wanberg and Kammeyer-Mueller 2000). Consequently, highly neurotic individuals would tend to minimize direct and indirect feedback-seeking strategies. Similar position is advocated by Levy et al. (1995) that individuals who are high in social anxiety have fewer intentions to seek feedback. The negative aspects of low emotionality instead make individuals choose observational methods, where information is sought in a way that the source is unaware of them being sought for feedback. Feedback sought this way, however can increase ambiguity and uncertainty.

Hypothesis 4a: *Neuroticism positively affects individual's reflective appraisal from supervisor and co-worker.*

2.3.5 Openness to Experience (OTE).

OTE describes the extent to which individuals are imaginative, open-minded, sensitive to aesthetics, curious, independent thinkers, and amenable to new ideas, experiences, and unconventional perspectives. OTE differentiates between those amenable to diversity, novelty, and those who choose the conventional, familiar routines (Costa and MCrae 1992; Barrick and Mount 1991; John and Srivastava 1999; McCrae and Costa 1997). People with high OTE are likely to be intellectually curious, have greater access to a variety of feelings, thoughts, perspectives, and ideas making them willing to challenge

the status quo (McCrae and Costa 1997). Highly open individuals tend to be more accepting to changing circumstances, enthusiastic, self-confident and creative in their field, and proactive while interacting with others (McCrae and Costa 1997). Uncertainty (the most commonly cited antecedent to feedback-seeking), a sub-dimension of OTE, leads highly open individuals to seek out situations and interpersonal resources who can provide clarity about their environment (Hodson and Sorrentino 1999). Their enthusiasm makes them to take initiative to improve their performance, enjoy exploring new things and new sources of information (LePine et al. 2000).

All these sub-traits make OTE as a trait which is often used to explain knowledge sharing within teams and decision-making in organizations (LePine et al. 2000; Matzler et al. 2011). Subsequently, this trait engages highly open individuals in continuous learning (London and Smither 1999). All sub-traits of OTE combine together allow highly open individuals to look for feedback which has less compliance implications and power; leaving room for creativity and originality. Hence, people with high openness tend to seek feedback through observational methods from co-workers other than inquiry (Krasman 2010). The reason lies in their preference for information being sought privately and the feedback being made implicit. This allows highly open individuals to bring creativity and originality in the ways of performing tasks, eventually improving their results.

Hypothesis 5a: *Openness positively effects individuals' reflective appraisal from supervisors and co-workers.*

A key theoretical challenge is to understand whether docility will moderate the hypothesized relation between BiG5 personality traits and FSB. This will be done after reviewing the concept of docility and understanding its important aspects.

2.4 Theoretical overview of concept of Docility.

The concept of docility first emerged in economics by late Herbert Simon (1976, 1990, and 1993) as a source of increasing human "fitness". Fitness is described as the adaptiveness of individuals (who can be entirely altruist or selfish) in a society through altruism in evolutionary competition by applying Darwinian approach. He defined it as human's "tendency to depend on suggestions, recommendations, persuasion, and information obtained through social channels as a major basis for choice" (Simon 1990:156). Simon (1976, 1990, and 1993) presented docility in a wider context with the assumptions supported theory of by bounded rationality (henceforth, BR).

Hence, it is BR which allows individuals to lean on external social sources providing additional information and assisting in manipulation of the information for optimal decision-making. The external sources (objects or tools) become resources once individual start exploiting them for the completion of any task (Bardone and Secchi 2009). Although the whole world is external to one's brain, literature has identified external resources as the available sources which carry (relevant or irrelevant) information or data in a certain context (Zey 1992) with a potential to assist completion of a task. Even when access of all the required external resources is made possible, the internal cognitive limitations are unable to process the information received to make optimal decision, which defines human cognition as entirely bounded in internal computational limits (Simon 1979).

In short, BR is the reason why individuals tend to depend on information coming from social channels during decision-making process (Simon 1990, 1993), making them docile. Simon's (1990, 1993) core idea was to present human docility as a day to day information-seeking from other people in society, in order to make decisions. In addition, he presented it as an approach to enhance individual's fitness which increases the chance

of individual's survival in a society. Afterwards, research in the field remained static as scholars barely employed Simon's concept of docility mainly due to its strong association with the traditional theory of BR (Secchi 2011). Although BR played an influential role in addressing studies of both individual and organizational decision-making (Simon 1955), it has been criticized for considering the subject of rationality at a purely technical level (Murphy 1992) disregarding how individuals exploit the social environment (Chase et al. 1998).

BR confines cognitive processes inside individual's head (e.g. feedback-seeker or decision maker) creating a divide between the internal and external resources (Simon 1955). As mentioned earlier, BR has never addressed any concept of "socially" based rationality (Secchi 2011) or human's "distributed" rationality or cognition (Hutchins 1995), the concept of docility has the potential to remodel the theory of BR by analyzing individuals in a social context (Secchi 2011). Furthermore, BR only emphasizes on what cannot be done due to internal and external limitations (Simon 1955) and discounts the "positives" of what can be done (Secchi 2011) consequently reducing the explanatory power of the theories associated with it. Recent work shows difficulties, challenges and, above all, understanding results of the BR approach (Conlisk 1996; Foss 2003). In a nutshell, BR attempts at defining the world as it is (Simon 1955, 1959) but only from a "negative" perspective (Foss 2003; Secchi 2011) and this decreases its explanatory power to support docility. In addition, the condition of BR to initiate docility isn't sufficient as it doesn't specify the reasons of leaning on social channels only (Secchi 2011). Therefore, the theory of docility lacked strong cognitive basis and comprehensiveness (Secchi 2011) which restricted researchers to explore it in organizational or behavioural studies.

In contrast, Hutchins (1995), Clark (1997, 2008), Clark and Chalmers (1998), and various others (e.g., Kirsh 2006; Sutton 2006, 2010) developed a different view on human

cognition, arguing that cognitive states and processes are, in some cases, distributed across other humans and artefacts present in a social environment. When the distribution occurs, humans together with technological or non-technological artefacts form an integrated social system that performs information-processing tasks. Hence, thinking or cognizing becomes a socially distributed process involving human brains, bodies and environmental resources (Heersmink 2017). This allows individual cognition being shaped by the exploitation of external resources consequently making cognition as part of the social system (Clark and Chalmers 1998). For example, simultaneously using satellite navigator to reach a destination along with one's own memory. So, once an individual exploits external resources, he/she is letting the resource affect their cognition; they are open to the influence of social system i.e. they are being docile. The degree of exploitation of external resources depends on multiple factors e.g. one's cognitive abilities, understanding of the task, and familiarity with the external resources. The external cognitive resources are part of the environment which provides individuals with basic tools for forming cognitive functions (e.g. thinking; Bardone and Secchi, 2009). These external resources assist in schematizing and coordinating the steps of cognitive activities, i.e. determine the methods in which individual brain (mind) assess, filter, store, organize and continually re-structure knowledge. The external resources become part of the cognitive system, consequently extending the bounds of rationality and allowing individual cognition to be distributed in the form of other resources (social or non-social) in the social environment (Hutchins 1995). Hence, individual's cognition is not restricted to the bounds of human brain (Clark 2003; Clark and Chalmers 1998), it is socially distributed in a system (Hutchins 1995) making classification of resources as internal and external a dynamic process. There are countless dynamic and complex sets of interaction through invisible links between the resources that stretch the bounds of rationality and

shape the cognitive functions (Clark and Chalmers 1998). "Human cognition has no limits, in the sense that they constantly renew and redefine themselves" (Bardone and Secchi 2009: 192) making the "shaping of cognitive system" a dynamic and ongoing process.

Let me use the satellite navigator's example once again to describe the expression of "shaping the cognitive system" as an *outside in* perspective of the distributed cognition approach (henceforth, DCA), where external resources, when exploited, influence internal resources through social interaction. The satellite navigator gives multiple options of routes to choose from with different attributes (e.g. distance and duration of journey) which are received by the brain as information. The role played by information is significant as the choice of best and prompt decision is based on it. The driver chooses the best option, evaluated by the internal cognitive functions, from the alternatives by depending on the information as well as to some extent on his/her preference. The navigator has the potential to shape individual understanding, recalling their memory of the route they followed for the same destination before, working of the cognitive functions which assist in evaluating alternatives and finally making decision of choosing the route on the navigator.

It is important to understand that the distributed cognition theory does not claim that inactive or dormant artefacts are cognitive in themselves; only used actively and integrated in the right manner do artefacts become part of a wider system and in that way obtain cognitive status (Heersmink 2017). The satellite navigator in itself does not belief anything, only the driver does; the active flow of information makes the wider system thus cognitive, but not the satellite navigator (the artefact).

There are countless instances and stimuli which make us respond in a new way which signifies that the brain has followed a different path to complete the cognitive function.

The human cognitive system is upgraded very frequently in a social environment through interactions with the objects, tools or other individuals. Following this concept, human cognitive system can be seen as a collection of information or data encapsulated in packages of resources and processes (Clark and Chalmers 1998) making them an external social resource (Magnani 2007) in a social environment, where docility is a behavioural representation of the use of socially distributed cognitive resources (Bardone and Secchi 2009; Magnani 2007; Secchi 2009).

In addition, to overcome internal limitations, individuals externalize their thoughts and ideas by creating and modifying tools and artefacts allowing their cognitive assets to be visible to others which become the basis for social interactions (Bardone and Secchi 2009). This whole phenomenon of transforming internally available information to external resource is termed as "externalization process". The resource becomes social when the creators show willingness to share the information contained in the resource and the seeker uses that information (Secchi 2011). To be precise, external social resource can be anything comprising of information that directly refers to other human beings (created by humans), where non-social resources are not directly associated to other individuals (not created by humans). The externalization process is an *inside out* perspective of DCA where the internal cognitive resources are reproduced outside the bounds of the brain in a more visible form of source or resource. This externalized resource can act as a cognitive mediator (Hutchins 1995) through which individuals can share their thoughts with others in the social system as well as for further development of new ideas. My brain is internal cognitive resource with functions allowing my fingers to externalize my thoughts by typing words through the keyboard on the word document saved on my computer as my external cognitive resource. The whole process of thinking, typing, reading and thinking again is a cycle which is continuously influencing my

cognitive system (expanding or decreasing cognition, Clark 2007, and rationality, Bardone and Secchi 2009) through a smart and complex link between both the *inside out* and *outside in* perspectives of DCA. The social interaction between internal and external cognitive resources occur through a kind of social interface provided by docility (Bardone and Secchi 2009).

Hence, docility is assumed to describe social side of not only DCA but also BR (Bardone and Secchi 2009; Secchi 2011) increasing the significance of this study. Such a behaviour of being receptive to the socially available information i) implies altruism, ii) influences outcome of one's decisions, and effects other people in the surrounding (Bardone and Secchi 2009; Simon 1990, 1993; Secchi 2011; Secchi and Bardone 2009, 2013). These aspects of docility are discussed as follows.

2.4.1 Docility implies altruism.

Simon related docility, i.e. the "receptivity to social influence" (Simon 1990:1665), with altruism and suggested it to be high in a population of docile individuals (Secchi 2009) as people share their social information resources with willingness because of their altruism. His idea on altruism was quite technical as he defined it as the "behaviour that reduces the actor's fitness while enhancing the fitness of others" (Simon 1993:126) rather than simply considering it in general terms i.e. unselfish concern for the welfare of others (Knudsen 2003). Altruism allows individuals to interact in a social environment with a condition that if one is altruist to the members of society, the recipient will reciprocate altruism back to the society (Axelrod 1997). This concept is termed as '*reciprocal altruism*' and is found to be more effective than docility in providing explanation of altruistic behaviour directed towards those who are non-kin (Johnson et al. 1992). In general, the idea of reciprocal altruism depends on the situation and context as well as who the recipient of the altruist act is. For example, I have been a regular blood donor for

patients of thalassemia (a blood disorder where the human body is unable to develop new blood cells and need blood transfusion regularly), I have been altruistic but have not demanded the same act of altruism from the recipients as they are unable to do that.

Similarly, there are unintelligent selfish individuals who are unable to distinguish between good and bad suggestions, but they use the information coming from them and do not provide any information in return. Opposing Simon's view on altruism, Secchi (2007) describes altruism as an act where individual gives someone (beneficiary) something for beneficiary's gain without any expectation of return to anyone including themselves. Where docility implies altruism; as the social system of interactions made to exchange information lead to altruism (Secchi 2007). The docile willingly sacrifice their fitness in a way that advantages other's fitness (Becker 1976; Simon 1993). Hence, docility nurtures altruism which makes social interactions possible (Secchi 2007).

The social interactions between individuals and social channels improve individual's fitness as they learn and seek knowledge resulting in developing new skills and exhibiting proper behaviours (Simon 1990). By proper behaviour Simon (1990) meant that individuals learn from the goals, values, and attitudes established by the social environment and when the receivers exhibit the same they secure supportive response from the other inhabitants. Subsequently, they learn altruism from the social environment which is why it is considered as a by-product of docility (Secchi 2009; Simon 1990).

2.4.2 Social influence.

Individuals "are fundamentally docile in their behaviour - i.e. for the most part, most human beings seek and give advice; further, they use advice from others as a basis for their choices and actions" (Augier and Sarasvathy 2004: 178). Docile individuals lean on social channels for information as they know they have better information than themselves (Simon 1990). The information from social channels eventually support and

enhance outcome of individual decisions by modifying their cognitive functions (Secchi 2011). This is only possible if one is open towards the social system. Such a behaviour increases one's tendency to be open to the influence of others behaviour, consequently influencing their adaptability to the social system and is learnt through social interactions. The times we seek information originating from other people around us is unlimited (Bonaccio and Dalal 2006; Harvey and Fischer 1997; Van Swol and Sniezek 2005). Without the access to the social channels and the information contained by the social resources filling the gaps in knowledge (Belkin et al. 1982), learning (McMillan 2016b; Miller and Lin 2010; Secchi 2007) and behaving in socially responsible manner (Secchi 2009) would have been impossible.

Whenever and wherever we are asked to make decisions we usually look for someone close to us for their advice. This behaviour is a built-in function in our bodies operating since our childhood when the social network was limited as our requirements were limited. To make decisions in an organizational environment we do the same by seeking information from colleagues, supervisors/managers, and other stakeholders. The transfer of information usually occurs through social interaction between the decision maker (i.e. feedback-seeker) and the source of information (e.g. accessible co-worker or supervisor). For the feedback-seeker, the source of information becomes basis of enhancing fitness. This research does not consider the overall society as Simon did as it is not practical to know the entire society (Secchi 2016) to seek information or to be influenced by. This research limits the individual to a social system like Secchi (2011; 2016) and Secchi and Bardone (2009) where number of people and the external social resources to be manipulated are limited such as in organizations. In an organizational setting, individuals can only interact with those who are closer to them (Secchi 2016) with a tendency to pass their docility to the members of the system they are part of (Secchi 2007). This

phenomenon is termed as *docility effect* and is created through interactions in a social system. When individuals interact in organizations they are open to other people's behaviour, i.e. their cognitive processes can be influenced by other people's behaviour creating docility effect.

The behaviour of taking suggestions, recommendation or information from other people is assumed to be contagious in a sense that people who are close to the docile individual will come to observe the benefits associated with taking information from social channels (Secchi and Bardone 2009, 2013; Secchi 2011, 2016). Benefits may include timely and better decisions made through active evaluation of available alternatives by acquisition, manipulation and utilization of high quality and quantity of information from social channels consequently improving adaptation and increasing chances of survival in the social system.

2.4.3 The emerging concept of docility.

Different scholars have contributed towards docility. After a decade of silence Knudsen (2003), for example, presented docility as a construct comprised of a cognitive and a motivational component. The former component denotes the tendency to form beliefs based on information received from authentic sources rather than relying on personal evaluation. The latter component describes the tendency to accept information based on social approval rather than individually held motives that are not socially acquired (Knudsen 2003). He restricted himself to Simon's original concept of individual's docility as a 'passive' disposition of individuals to accept and believe the instructions received through the social channels. Rather than considering society (Simon 1990, 1993) for the understanding of the concept of docility, Knudsen (2003) emphasized the accumulation of knowledge by individuals in an organized social group that would give

each member of the group a fitness advantage, compared to a situation where the members were independent individuals.

The recent developments in the theory of docility are carried out in organizational management studies with influential contributions made by Davide Secchi and Emanuele Bardone through several publications (independent and co-authored) in redefining, extending and relating the concept with other individual behavioural and cognitive aspects. They have introduced an active component of docility (Bardone and Secchi 2009; Secchi 2011; Secchi and Bardone 2009) by linking it to the distribution and exploitation of cognitive resources that are positioned outside the physical boundary of human brain (Clark and Chalmers 1998). As mentioned earlier, the modified definition highlights that docility is not just about the tendency of 'taking information', on the one hand, it is also about 'providing information' on the other hand. Information giving or providing is defined as "the act of disseminating messages [which] may be communicated in written (graphics), verbal, visual, or tactile forms" (Krikelas 1983: 13). Hence, docility is not constrained to information received or provided through verbal comment, advice or suggestion but it is about the information received or provided by individuals in any other form. Precisely, docility can be defined as a decision-making process which considers involvement of external social channels (Secchi 2011). The definition of "social channels" have changed especially after the advent of the web (Secchi 2011; Magnani 2007). It can be defined as someone or something which is willing to exchange information with or without being mediated by technological devices (e.g. smartphone, computers) or services (e.g. Siri on iPhone, social media like Facebook, Google search engines). In a way, a docile individual is associated with a group of social channels which assist him/her in decision-making, allowing them to be a knowledgeable social resource themselves. The extendibility of the boundaries of this group depends on the level of

individual docility. If an individual is actively docile, they can create more social resources or channels which ultimately increase the boundaries of the social group or network. Whereas, if passively docile, the number seems to decrease rather increase due to some selfish characteristics of just taking information and not reciprocating the acts of altruism. The following section describes the types of social boundaries in which docility has been presented in literature.

2.4.4 The question of boundaries.

Simon (1976, 1990, and 1993) defined docility based on individual's receptivity to social influence (if an individual is receptive to social influence he/she is docile and if not, he/she is non-docile). He has indicated that it is the social environment (i.e. society) which defines individual's extent of docility. It should be remembered that Simon introduced concept of docility based on biological and social arguments. He looked at docility as an evolved property of human; a property used for enhancing fitness for survival in the society. Although, he defined passive side of docility (Secchi and Bardone 2009). However, he let the agent explore the whole society to gain information to learn. That is, docile was presented as an active individual where docility as a passive mechanism. In contrast to Simon's ideology of not restricting docility to certain boundaries, later research (e.g. Bardone and Secchi 2017; Knudsen 2003; Secchi and Bardone 2009; Secchi 2016; Thomsen 2016) indicated it as a mechanism which allows individuals to receive information/instructions from others within a set social system (e.g., organization). This perspective makes the concept of docility more realistic in a sense that individuals have limited interaction abilities in accordance with their bounded rationality (Simon 1997; Secchi 2011). That is, human interacts with limited number of people in a social system as he or she is unable to know the entire system, consequently he or she can only be influenced by the individuals who are closer and accessible.

In organizations, people do not know or interact with everyone resulting in limited interactions with the people who are close to them. Secchi (2016) took it a little further by introducing a realistic assumption of 'range' describing that individuals do not know the entire system and can only be influenced by the individuals who are closer and accessible. Thus, everyone's fitness is relative to the number of individuals who are close to them (Secchi 2016) instead of the entire population (Simon 1993).

Recent publication in *Team Performance Management* has discussed individual docility as a tool used for cooperation with others in predefined situations aiming to fulfill a specific task (e.g., a team project; Bardone and Secchi 2017). Their ideas have narrowed individual docility further down to group or team level where docile individual works within boundaries which have pre-specified number of social resources (e.g., fixed number of team members). If defined this way, docility will allow to cooperate with team members when the decisions based on socially exchanged information will influence the whole team, not only the individual. This advancement in the concept indicates that docile individuals tend to work within boundaries which are pre-defined. Hence, it is the boundary which affects docile individual's behaviour and characterizes their level of docility (Bardone and Secchi 2017). The boundary condition makes individuals less docile; as they tend to learn by gaining information from restricted number of social channels. In addition, they are unable to create any new social cognitive resources unless a new member arrives, or the group is merged with another within or outside the organization. This approach to docility is more supported by theory of BR rather than DCA. Appendix 1 provides list of literature contributing towards the concept of docility since its inception.

2.4.5 The fundamentals of docility.

The literature (e.g. Secchi and Bardone 2009; Secchi 2011) has informed about three basic pre-conditions which support the way docility emerges in a social environment. These pre-conditions are fundamental to describing docility in organizations since the stress on the first, the second, or the third element can change the quality and quantity of socially based decisions (Secchi 2011). Following are the three pre-conditions for the emergence of docility.

1. being part of a community,
2. following set standards to encrypt information, and
3. ensuring public availability of information.

2.4.5.1 Being part of a community.

Docility emerges only if and when individuals share something, this being the place where they live, work, a goal, a thought, an ideology, or more. Being part of a community enhances individual's sentiments of trust and cooperation leading to emergence of docility. This makes docility community based (Secchi 2011). The basic idea is that people are docile in a familiar or known environment. It is unlikely that people become docile in a community of strangers. In other terms, and all other conditions being equal, docility emerges in social environments where there is something to share: communities.

2.4.5.2 Existence of standard for information sharing.

This pre-requisite is obvious for communicating and sharing social information within a given social community. Use of set standards for communication allows individuals to understand each other. That is to say, docile individual tends to follow set standards. This tendency is called *standard-fidelity* (Bardone et al. 2006), and has significant cognitive relevance, as it makes information and knowledge transmission much easier. For example, in an operation theatre, a team of doctors and paramedics use their standard

medical terminologies with anesthetist during an operation. They are being part of a community who constantly share information to make decisions by using their standard medical terms, patterns and behaviour. Using set standards for information sharing assists in understanding what is being communicated and allows team members to make decisions.

Docility emerges when people use the appropriate media, methods, behaviours, and follow the (formal and informal) rules that enable a decision based on socially obtained information. In other words, social information carries and assists decision only when a standard has been fulfilled. Lack of standards may impede emergence of docility which is, in turn, a threat to individual's decision-making.

2.4.5.3 The public availability of information.

After the information is externalized and created, it is at the discretion of the creator whether the produced information is made accessible to others or not. When the source has decided for the information to go public, it must follow set standards and instructions about how to access the information needs to be provided (e.g. publication of research articles). This public availability of information allows docility to emerge as it encourages individuals to seek information from the resource to facilitate their decision-making.

If only one condition of these three is missing, active docility is less likely to emerge (Secchi 2011). Docility in organizations depends on the fact that one, two, or all three conditions/dimensions prevail. The simulation-based study (in Chapter 5) has looked at the influence of organizational characteristics ─ informal and formal structures, cost of seeking information, cost of sharing information, and range of interaction ─ in a way that may influence the emergence of docility by restricting these pre-conditions.

The pre-conditions influence emergence of different levels of docility making it a dynamic process as "we cannot expect a constant level of docility from the same

individual in different contexts" (Secchi 2011:118). To avoid duplication, I have provided a short description of individual's active and passive side of docility which guides towards explaining different types of docility. This will lead to explaining the moderating effect of different types of docility on the relationship between BiG5 personality traits and feedback-seeking strategies as hypothesized earlier. The types of docility are explained in detail in chapter 5 for the simulation-based study.

2.4.6 Active and passive docility.

Individuals' tendency to lean on SOI depends on their understanding of its significance, which classifies individuals into different types of passive docility. Passively docile individuals take information from the social channels and do not provide anything in return due to either being unable to provide or being self-centered or unable to understand the basics of knowledge exchange or cooperation. The passive side of docility can be a motivation towards altruism to some extent as it allows individuals to accept and believe what is provided by others (Knudsen 2003; Johnson et al. 1992) and please the society by making decisions based on their information.

In contrast, the active side of docility not only accepts and believes what is received but also provides information which is much closer to altruism specifying human thinking (rationality) in terms of the social system (Secchi 2007). The active docility allows individuals to lean on externalizing their thoughts and ideas to develop social information resources for the community as well as for improving their cognitive system to make better decisions. There are variations in active side of docility with respect to situation and time. The active side of docility allows individuals to take high quantity and quality of information but also provide enhanced information to the social channels (Secchi and Bardone 2009), they are being docile and altruistic. The role of "quality of information shared" (Secchi and Bardone 2009:9) among the like-minded people specifies that the

information shared is relative and effective for the decision makers to evaluate the alternatives and make decisions which fit in the system.

Generally, the higher the quality, that is the high relevance of information enhances individual's ability to process received information consequently increasing the effectiveness of decisions (Keller and Staelin 1987) allowing the individual to fit in the social context. Together with the "quality of information shared" (Secchi and Bardone 2009: 9) the extent to which individual is influenced by information from social resource describe the difference between more or less docile individuals (Secchi 2011). Individual might present docility "below, on or above the average of the other docile individuals in the population" (Secchi and Bardone 2009:340). As mentioned above, docility recognizes a class of individuals — the docile individuals — who are characterized by reliance on the SOI along with a general inclination to share information with people who need help in completion of their cognitive tasks resulting in collaboration (Secchi and Bardone 2009; Simon 1993; Knudsen 2003). Literature has further divided docile individuals into two categories, people who are only ordinarily docile (average docile) from those who are highly docile (above average docile) (Secchi 2011; Secchi and Bardone 2009). People who do not use significant amount of information (i.e. suggestions, comments, advice, and recommendations) from others to carry out any cognitive activity are non-docile. The following sections explain the characteristics of non-docile and actively docile (highly docile) individuals within organizational settings.

2.4.6.1 Non-docile.

Non-docile represents individuals who carry out their cognitive activities independently and do not utilize any SOI, as they are unable to identify the significance of using socially available information for decision-making (Secchi 2011; Simon 1993). Due to their inability they look a lot like "social fools" as described by Etzioni (1988). They tend to

avoid any social contact and participation in organizational activities. They refrain themselves from seeking advice, suggestion or information because they do not want to expose their vulnerabilities and feel threatened by being dependent upon others. They are deskbound especially when surrounded by other individuals. They are surrounded by very limited inanimate personal resources which they use to make their decisions.

As they are not docile, they cannot be altruist towards the social system (Secchi 2007) hence, they do not provide suggestions, comments, information or advice to anyone in the social system. They do not cooperate with their colleagues. In organizations, these individuals are the ones who are unsatisfied by the company and uncomfortable with the people around them. They are also the ones who while working in one organization keep on looking for another job somewhere else (Secchi and Bardone 2009).

2.4.6.2 Actively docile (highly docile).

Highly docile are the ones who show the highest level of docility by utilizing both the passive and active sides of docility at their best (Secchi 2011; Secchi and Bardone 2009). Once received, they use the information differently depending on whether it is coming from expert or a novice advisor (Harvey and Fisher 1997). They usually depend on the information received from "legitimate or qualified sources rather than relying on a personal evaluation" (Knudsen 2003: 231). Therefore, docility becomes an attitude of individuals interacting with more knowledgeable social channels for information exchange for decision-making. I emphasize on more knowledgeable social channels as the aggregation of the number of opinions (drawn randomly from a knowledgeable population of one's social system or network) improves accuracy of the decision (Yaniv and Kleinberger 2000) and increases chances of survival in a social system. It is well established from the literature that individuals usually seek information or advice from other individuals who are more skilful, knowledgeable, wiser, expert, older, better

educated, and have a better experience of life (Bonaccio and Dalal 2006; Harvey and Fischer 1997; Sniezek et al. 2004). Similarly, advice from experts is more likely to go through and used by decision makers (Sniezek et al. 2004) as it is viewed as more helpful, less intrusive (Goldsmith and Fitch 1997), and more influential (Jungermann and Fischer 2005). They continually develop their skills and improve their knowledge through maximum utilization of social channels. They have cluster of social resources around them for easy and uninterrupted exchange of information, and to show their knowledge and proficiency in their job. This makes giving importance to *role of knowledge* in choosing social channels as one of the determining factors of docility.

Highly docile take information from knowledgeable sources with the aim to evaluate, filter, and further enhance the information. Active side of docility acts as a pathway to "externalize" more thoughts, ideas and information in the form of external cognitive sources which can be social or non-social (Bardone and Secchi 2009). This is how individuals distribute their own cognition which assists in improving their cognitive abilities (active docile) as well as helping others (passive docile) in solving their problems and decisions. The "externalization" allows actively docile individuals to share information and make passive seekers comfortable at work. Once information is externalized and cognitive activities (sub functions) are delegated to others, a strong bond exists between the social cognitive channels based on trust which makes them more willing to be docile and refrain them to be self-interested (Das and Teng 1998; McAllister 1995). As cognitive activities are essentially distributed (Cowley and Valleé-Tourangeau 2013; Hutchins 1995; Magnani 2007), decision-making becomes a socially distributed process relying on sharing information with social channels by becoming docile. Using this shared information makes decision-making a socially distributed process which is possible only if individual is docile. Where, docility becomes a behavioural

representation of the use of socially distributed cognitive resources (Bardone and Secchi 2009; Magnani 2007; Magnani et al. 2007; Secchi 2009). Therefore, *socially distributed decision-making* can identify level of individual's docility.

Due to relying on socially based decision-making, highly docile takes a more collaborative and cooperation-based stance on it (Bardone and Secchi 2017), as he or she shows willingness to use external social resources and let others to exploit their cognitive abilities. The collaborative approach enhances creativity (Amabile 2005) and improves individual's learning (McMillan 2016b). Cooperation between employees is a key characteristic of organization social climate that limits competition (Szulanski 1996) and motivates knowledge exchange (Nahapiet and Ghoshal 1999). Docile individuals tend to feel committed to exchange knowledge with like-minded individuals, so that the act of kindness and cooperation is reciprocated. Their dependability on learning from each other creates a social learning environment where cooperation is used to accomplish daily tasks. This disposition of using socially exchanged information for decision-making is defined as docility. This makes giving importance to *sociability and learning environment* as one of the determining factors of docility.

In addition, highly docile trusts reliable people and expect others to act responsibly (Secchi 2009). They spend time in participating in organizational activities with their co-workers, in listening to their concerns, and solving their problems. Docile individuals tend to be well informed of their job roles, team goals and objectives. They are willing to help others to understand the purpose and main objective of their job roles. Hence, docility is determined by how *responsible and liable* individual stands within a community (Secchi 2009).

All these attributes of highly docile and non-docile individuals have the potential to influence their behaviour and cognitive processes within a social environment. The

following section explains and hypothesizes how does low or high docility and the BiG5 personality traits interact with respect to feedback-seeking behaviour within organizational environment.

2.5 Docility: Hypotheses Development.

Hypotheses 1a to 5a posit that BiG5 personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and OTE) influence and contribute to explaining FSB. This section develops the hypothesis that docility acts as a moderator in this relationship. Drawing on the theoretical effect of docility, I argue that docility has an impact in moderating the relationship between FSB and individual personality traits. I present docility as a mechanism which allows individuals to seek information in the form of feedback from socially distributed cognitive resources within a given environment. Therefore, the social environment holds the potential of influencing the information seekers' cognitive functions (e.g., decision-making about task performance) through exchanging information either through direct, indirect or reflect appraisal strategies.

2.5.1 Influence on FSB when docility interacts with extraversion.

Provided, extraverts devote majority of their time in socializing (Costa and McCrae 1992; Costa et al. 2001), even though the proactive communication is assumed to highlight themselves. This attitude leaves the person with a distinct cognitive pattern that is closer to egotism (Leary 2007). In addition, highly extraverts' confidence in themselves tends to restrict them to find any significance in using SOI. We do come across people who initiate a conversation and make themselves as the main character of the story and highlight their achievements due to their ways of performing tasks. Observing such an attitude having a connection with verbal feedback-seeking from social channels seems to get very hazy in presence of docile behaviour. The reason is based on the key aspect of docility that one gives importance to information coming from social channels as they

know better than an independent knows (Secchi 2011; Simon 1993). Usually, people's abilities of identifying significant sources of information are encouraged by high level of docility, which may trigger for feedback-seeking through interpersonal interactions. In contrast, non-docile behaviour seems to discourage highly extraverts to initiate any social interaction and use of SOI.

It appears that high level of docility weakens the relationship between extraversion and direct feedback-seeking from supervisors as it promotes use of SOI leading to enhancement in performance and not just proactive communication or social interaction. Hence, I hypothesize that:

Hypothesis 1b. Individual docility (high docile behaviour) weakens the positive relationship between extraversion and direct feedback-seeking from supervisor.

2.5.2 Influence on FSB when docility interacts with agreeableness.

Agreeableness clusters attributes which are supported by high docility such as, trust, straightforwardness, warmth, altruism, compliance, and modesty. These characterizations lead to a pro-social behaviour at work including activities, such as helping co-workers (e.g. Van Dyne and LePine 1998). High level of docility encourages agreeable individuals to actively engage and cooperate with others, allowing them to be influenced by the social environment and its resources. Consequently, the social information exchanged through active engagement (e.g. direct feedback sought from others) and cooperation tends to improve performance as information is socially based. High level of docility makes agreeable individuals rely on credible sources of information with minimum ambiguity. Typically, people's preference of exchanging information with credible sources and be cooperative during social interaction are encouraged by high level of docility, which may trigger for feedback-seeking through interpersonal interaction with reliable sources. It appears that docility strengthens the relationship between high agreeableness and direct

feedback-seeking from supervisors as it promotes altruism, co-operation, and prefers trustworthy and reliable sources of information. Hence, I hypothesize that:

Hypothesis 2b. *Individual docility (high docile behaviour) strengthens the positive relationship between agreeableness and direct feedback-seeking from supervisor.*

2.5.3 Influence on FSB when docility interacts with conscientiousness.

The research has looked at the conservative and excessively meticulous side of conscientiousness (Costa and McCrae 1992; Murphy 1996) which may cause certain degree of inflexibility (LePine 2003) and difficulties in demonstrating interpersonal adaptability (Pulakos et al. 2000). All these features combine together to make highly conscientious individuals avoid interacting with others to seek feedback which can suggest change in their methods of performing tasks. This behaviour seems to be assisted by non-docile behaviour where social interactions are discouraged due to not understanding the significance of SOI and following routines without bringing any innovation. Whereas, high level of docility will encourage cooperation through interpersonal interactions (Secchi 2011) highlighting the dependability and reliability side of conscientious individuals. High level of docility will discourage the behaviour of avoiding use of high quality of information coming from a reliable source. Thus, it is hypothesized that:

Hypothesis 3b: *Individual docility (high docile behaviour) weakens the negative relationship between conscientiousness and direct feedback-seeking from supervisor.*

2.5.4 Influence on FSB when docility interacts with neuroticism.

Non-docile individuals consider themselves as self-sufficient and do not rely on exchanging information with social channels for decision-making (Secchi 2011). Hence, they don't need to make social interactions within the social system they are part of (Secchi 2007). Consequently, their non-docile attitude builds negative behavioural

responses towards a social system (Secchi 2011; Simon 1993). It is assumed that individual's non-docile behaviour (Simon 1993) tends to encourage highly neurotic individual's negative thoughts about the organization and co-workers (Taylor and Kluemper 2012; Fox and Spector 1999) thus, avoiding seeking feedback from supervisors and co-workers. When individuals' preference of avoiding social interactions is encouraged by non-docile behaviour, it is challenging to seek feedback through direct and indirect inquiry methods. Similarly, when neurotic people show willingness to be open to the influence of social system through observational and private methods, non-docile behaviour tends to discourage use of SOI. Thus, it is hypothesized that:

Hypothesis 4b*: Individual docility (non-docile behaviour) weakens the positive relationship between neuroticism and reflective appraisal from supervisor and co-workers.*

2.5.5 Influence on FSB when docility interacts with OTE.

When docility is high, individual attempts to reach their greatest potential to seek and utilize information from social channels to assist their decision-making (Secchi 2011; Secchi and Bardone 2009). This kind of attitude may allow highly open individuals to vigorously take maximum feedback comprising of new ideas from multiple social channels through observational methods. High docility tends to actively manipulate SOI for improving quality and bringing originality in the piece of information. Working outside the routines is another key characteristic of highly docile behaviour. Therefore, high level of docility will encourage highly open individuals to use feedback sought through reflective appraisal from supervisor and co-workers, so there is enough room for improvement and creativity. Whereas, non-docile behaviour may assist open individuals in abstaining interpersonal interactions and preferring observational methods. However, the main characteristic of non-docile behaviour is to restrict use of SOI regardless of the methods. The non-docile behaviour will discourage highly open individuals to initiate

any activity which triggers working outside the routines. Hence, individual non-docile behaviour tends to weaken the hypothesized positive relationship between high openness and reflective appraisal from supervisors and co-workers.

Hypothesis 5b: *Individual docility (non-docile behaviour) weakens the positive relationship between OTE and reflective appraisal from supervisors and co-workers.*

Figure 2.1 summarizes above discussion and depicts the theoretical model. It displays the relationship between variables including personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism and OTE), Docility and FSB (strategies: Direct feedback from supervisor, direct feedback from co-worker, indirect feedback from supervisor and co-worker, reflective appraisal from supervisor and co-worker). The following section briefly summarizes the chapter.

Figure 2. 1 Proposed conceptual model

Personality

- Extraversion
- Agreeableness
- Conscientiousness
- Neuroticism
- OTE

Docility

FSB

- Direct from supervisor
- Direct from co-worker
- Indirect from supervisor/co-worker
- RA from supervisor/co-worker

58
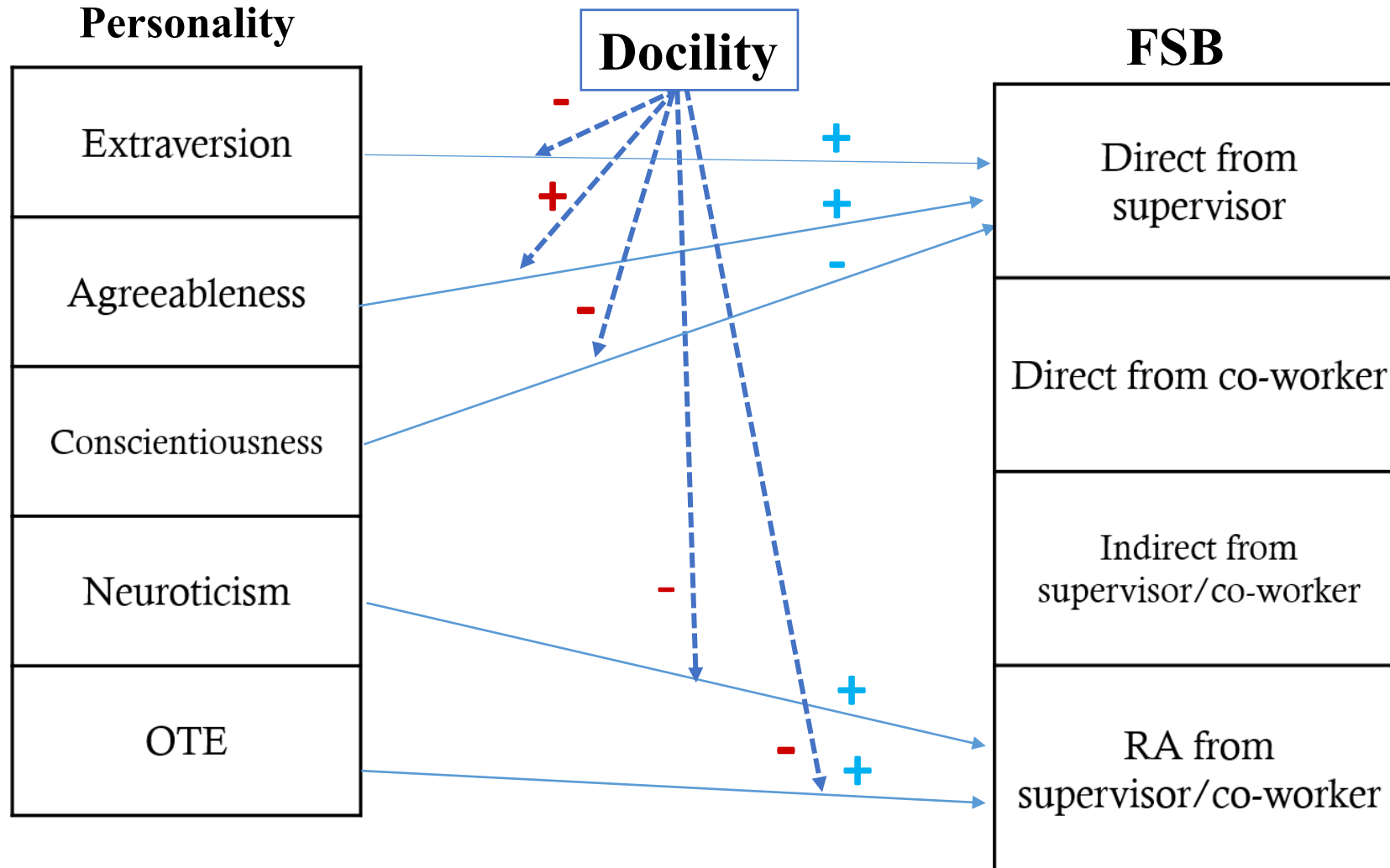
Note: Solid lines represent direct effect and dotted lines represent moderation effect. Research has not hypothesized influence on direct feedback from co-worker and Indirect feedback from supervisor and co-worker by BiG5 personality traits. Relationships are presented in chapter 4.
OTE= Openness to experience, FSB = Feedback-seeking behavior, RA= Reflective appraisal.

2.6 Summary.

This chapter has presented a theoretical overview of relevant literature about FSB, personality traits and docility. Individual's FSB refers to the proactive search for informal, evaluative information about their work (Ashford and Cummings 1983). This behaviour is potentially influenced by individual's personality (Krasman 2010; Tidwell and Sias 2005). Hypotheses are presented on the relationships between BiG5 personality traits and feedback-seeking strategies. Findings from the previous research have been inconsistent indicating the possibility of cognitive and psychological factors to moderate the effect of personality on individual's choice of feedback-seeking strategy (direct, indirect, or reflective appraisal), preference for source of information (supervisor or co-worker), how they want the information to be exchanged (public or private), and whether feedback is given in the form of explicit or implicit information. This is followed by a detailed explanation of concept of docility which has evolved as a typical human trait that emerges whenever we make decisions based on information actively exchanged with other human beings.

There are three basic pre-conditions that support the way docility emerges in any given environment between individuals. Individual's docility depends on (a) being part of a community, (b) following set standards to encrypt information, and (c) ensuring public availability of information. Individuals can be defined based on the extent to which they show active and passive docile behaviour. Individuals can be either docile or non-docile. The conceptual model is presented in detail how different levels of docility assist individuals with different personality in seeking or avoiding feedback. The next chapter discusses the methodological aspects of the two empirical studies. First study is the survey-based study aimed at testing the conceptual model presented in this chapter.

Second is the simulation-based research to uncover the conditions which are suitable for docility to emerge within organizational environment.

Chapter 3: Research methodology.

3.1 Introduction.

The previous chapter provided conceptual underpinnings of the research model. This chapter outlines the available methodological options and provides justification for all methodological decisions undertaken that guided the following studies in chapter 4 (empirical test of theoretical model) and chapter 5 (Use of agent-based modelling to find organizational characteristics affecting emergence of docility). The following sections focus on providing some explanation on my decision on research philosophy, research approach, strategies, specific data collection methods, techniques and procedures i.e., research sampling and data analysis techniques. The chapter discusses measures of main variables which are further described in chapter 4 for the empirical part of the research. The chapter highlights the philosophy of ABM and its use in organizational studies. Finally, the chapter acknowledges the limitations and ethical issues of the research.

3.2 Methodology.

Before justifying research design and the applied sampling technique, understanding the researchers' ontological and epistemological rational is significant in determining how the philosophy will influence the research (Bryman and Bell 2015). Since research paradigms are the ways of explaining basic set of beliefs that one has (i.e., at a philosophical level), they have influence on the ways one does research (i.e., practical aspects of doing a thesis). Paradigm can be defined as a general orientation about the world and the nature of research the researcher holds (Creswell 2013). In a nutshell, the research paradigm is about how researchers view the world (Jonker and Pennink 2010). Paradigms define the knowledge that needs to be found including the researcher's belief on how that knowledge can be found, that is, it guides the process of research design. According to Guba and Lincoln (1994) and Punch (2014) research paradigm addresses three fundamental questions defined under headings of ontological, epistemological, and methodological prescriptions that guide the research process. The means of answering these three questions are closely interrelated. For example, uncovering the nature of the real world (ontology) through various methods (methodology) is defined by researcher's view of the world (epistemology). The following section defines these three fundamental questions followed by differentiating between categories and boundaries of paradigms; *positivism, critical realism* and *interpretivism*.

3.2.1 Ontology.

Ontology addresses questions related to nature of reality, i.e. what the reality is like (Punch 2014). It has two aspects. First is *objectivism* which represents researcher's assumptions about the way the world operates. It answers ontological question about nature of reality and whether reality exists independent from researcher's knowledge on which foundations can be based. Second is *subjectivism*, which represents the world as a

combination of social phenomena created from the perceptions and subsequent actions of those social actors concerned with their existence (Saunders et al. 2012).

3.2.2 Epistemology.

Epistemology defines the relationship between the researcher and the reality (Punch 2014) and addresses the ways of knowing reality i.e. ways of getting knowledge about the phenomenon one is interested in. The epistemological question answers the *how we know* what we want to know?

3.2.3 Methodology.

Methodology is about what methods can be used for studying the reality and 'how' do we get the data? Is it through a survey questionnaire or interview? It mainly focuses on researcher's choice of research methods and data collection techniques.

It is important to understand research paradigms particularly in reference to research methodology. There are two main paradigms, namely ***positivism*** and ***interpretivism***, on which further paradigms are based, namely ***post-positivism, critical theory*** and ***pragmatism***.

3.2.3.1 Positivism.

It is a paradigm which uses scientific methods to advocate the application of the natural science to study social reality and beyond (Bryman 2012). Positivists believe that there is one single reality, which can be measured and known. In this paradigm, deductive reasoning is applied to generate hypotheses based on existing theories. Structured surveys and data collection techniques are most often chosen to test hypotheses (Saunders et al. 2012). It is crucially important for positivists to choose an instrument reflecting the reality. Therefore, researchers adopting positivism need to present the reliability and validity of the chosen measuring instruments before providing their findings to the existing knowledge (Brannick and Coghlan 2007). One must remain as objective as

possible while conducing analysis and interpretation of the collected data. Traditional positivists have confidence in the absolute truth of knowledge which is independent from researchers themselves (Creswell 2013). Over the past century, positivism has been a dominating approach for studies of social behaviour. However, the debate about the appropriateness of applying natural science models for the study of society also has been long standing, because studying social issues is more complicated than studying physical objects (Bryman 2012). In addition, unlike the natural sciences, it is difficult to detach oneself from the hypotheses completely (Cohen et al. 2007). Furthermore, positivism seems to face limitations due to complexity and researcher's bias (Schutt 2006).

3.2.3.2 Post-positivism.

It is a modification of positivism which attempts to limit the weakness of positivism, however it still believes in the existence of a true, objective reality in the world (Bagozzi et al. 1991). Post-positivists postulate that reality can be observed through instruments and nature still can be predicted from causes and outcomes by using scientific formulation (Bagozzi et al. 1991). However, post-positivists acknowledge that it is impossible for humans to discover the ultimate truth due to bounded rationality or humans' imperfect sensory and intellectual mechanisms (Guba 1990) especially when studying human behaviour (Cresswell 2009). Therefore, whatever we see is only a part of a bigger picture (Saunders et al. 2012). Although positivists and post-positivists stand on the same grounds, however there are two main critical points on which they disagree. *First*, post-positivists agree with positivists on the idea of human abilities to observe and measure the real world, however, they criticize that observations cannot be totally independent from researchers' value and bias. *Second*, positivists perceive that world is relatively stable and businesses operate on a single level. Whereas, post-positivists embrace the fact

that social world is constantly changing, and businesses should be studied at multiple levels.

One of the most common methods of post-positivism is a philosophy called *critical realism*. A critical realist believes that reality is independent of what we perceive exists, and that our knowledge of social organizations is transitive (Pearce and Frauley 2007). That is, the reality is indirectly observed through various data collection methods and explanations; which are provisional in nature (Bryman 2012). The critical realist is critical of individual ability to know reality with certainty. While, a positivist believes that the goal is to uncover the truth, the post-positivist critical realist believes that the goal of science is to hold persistently to the goal of getting it right about reality, even though it can never be achieved. The difference is that the post-positivist critical realist knows that all observation is fallible and has error and that all theory is revisable.

3.2.3.3 Interpretivism.

It involves researchers to interpret elements of the study through social interaction with research subjects, thus interpretivism integrates human interest into a study. Interpretivists believe that individuals seek understanding of the world from their subjective experience. In contrast to positivist approach, interpretivist assume that access to reality (given or socially constructed) is only through social constructions, for example language, consciousness, shared meanings, and instruments (Myers 2008). Interpretivists oppose scientific methods as they see humans as intricate and complex social entities who respond to the same objective reality in totally different way and have their own, often very different, reasons for acting that way in the world. They prefer qualitative methods, such as interviews to gather views from interviewees. It is essential for the researcher as a social actor to appreciate differences between people (Saunders et al. 2012) and be empathetic so that they can understand the views from other peoples' situations. Briefly,

interpretivism aims to make sense of the meaning of the world from others' views. Instead of starting from theories, interpretivists inductively build theories from data gathered through social interaction with the research subjects. Main disadvantages associated with interpretivism relate to subjective nature of this approach and great room for bias on behalf of researcher.

3.3 Choice of research paradigm.

The research's aims and objectives stated in the first chapter emphasize the empirical relationships between different variables, which are better addressed from a post-positivist side of the philosophical debates. My values on the real world and experience of applying mathematical methods for assessing social issues, post-positivism seemed a more appropriate philosophical stance for this research other than the rest. I do believe that humans have limited cognitive abilities and limited access to the environmental sources which restrict uncovering the reality. However, this limitation can be overcome to some extent by delegating cognitive activities to the external cognitive resources (social and non-social), yet again there are other external factors and research bias (Guba 1990) which limit uncovering the ultimate truth. Consequently, the philosophy of constantly changing social world fits with the idea of this study about exploring different cognitive and varying behavioural aspects which can influence employees FSB. In addition, I believe that it is important to study organizational behaviour from multiple levels rather than from a single level. Hence, my research questions are better answered by post-positivism philosophy. I am aware of the limitations of using hard data and highly structured data collection instruments to analyse human psychological, cognitive and behavioural aspects. However, compared with other research philosophies, post-positivism is a best fit for my research study and ideology.

3.3.1 The choice of a quantitative approach.

The choice of the research approach relies on the research questions and the choice of philosophical stance. As my research is supported by positivist spirits, I have selected to engage myself in survey research for addressing first research question and employ quantitative method of statistical analysis. The research questions are deducted based on existing theories and aim to study the relationship between different variables of interests. Therefore, I have used inferential surveys as they aim to establish relationships between variables and concepts, whether there are previous assumptions and hypotheses vis-à-vis the nature of these relationships (Easterby-Smith et al. 2012).

First, I isolated the factors which appeared to be involved and then decided which variables are the independent variables (independent variable: BiG5 personality traits and docility) and which are the outcome variables (dependent variable: FSB). The independent variables (IV) are assumed to affect the dependent variable (DV). The conceptual framework was presented in chapter 2, where BiG5 personality traits are hypothesised to influence individual FSB. This is followed by suggesting role of docility in moderating the hypothesized relationships. To test these hypotheses, it is deemed necessary to define methods to measure each of these variables through number of items in a questionnaire, which are then completed by sample of employees. Indeed, this requires that the measures of the IV and DV are precise and valid, and the sample is suitable in terms of size and composition to test the hypothesis. My research involves complex relationships between IV and DV which are analysed through ordinary least squares in next chapter. I have provided an overview of the measures and given detail of factor analysis methods for the measurement models (Exploratory and confirmatory factor analysis) in Chapter no. 4.

The use of a questionnaire has helped in measuring numerically particular aspects of key

research variables, seeking general description and examining causal relationships between research concepts which have never been explored. In addition, as a quantitative researcher, I act as external to the reality who observed and measured seeking independent relationship with the research subject to increase its objectivity and reduce the bias of collected data. The findings of the research are possible to be more generalized and description based under quantitative methods (Daymon and Holloway 2011). In addition, questionnaires allow the research to standardize their data collection; minimizing occurrence of errors (Bryman and Bell 2015). However, self-reported questionnaires have been criticized on which Bryman and Bell (2015) argue that there is no opportunity to prompt, probe or expand upon answers. Nevertheless, using a survey comprising of verified scales is faster than conducting interviews and one can collect more data with lower administration costs (Bryman and Bell 2015).

As a positivist researcher, my ontology leans towards post-positivism and epistemology inclines towards using tools to measure relationship between variables which makeup the reality. My journey of research as a post positivist started with a theory, followed by building hypotheses, leading to data collection through survey questionnaires and analyses of data through ordinary least squares (OLS) which either supported or refuted the theory.

Research in the field of information behaviour has either followed positivist or constructivist philosophy. Consensus on antecedents and outcomes of FSB is grounded on robust empirical results instead of implicit notions about what is believed to be true (Anseel et al. 2015). Most of the research in FSB is quantitative in nature. Studies on personality are quantitative in nature and stem from realist philosophy. Whereas, limited studies on docility have followed positivist philosophy and have used quantitative research methods including agent-based modelling (ABM, like Secchi 2016; Thomsen

2016; Bardone and Secchi 2017). Being a quantitative researcher, reality is conceptualized as variables, and the ultimate objective is to find out whether these different variables are related to each other or not, if they are, how and why? The essence of my quantitative research is the empirical study of the established theoretic relationship between variables (BiG5 personality traits and FSB) and analysing role of docility as a moderator of this relationship. In addition, I have followed the culture of using ABM for studying docility and have developed a simulation model, where organizational factors are identified which can affect the emergence of individual docility.

3.3.2 Choice of non-experimental research design.

One of the goals of conducting quantitative research study is to determine the relationship between IV and DV within a given population. The field of quantitative design mainly comprises of two strands, namely *experimental* and *non-experimental* design. For *experimental study*, researcher can manipulate IV and subjects in order to identify a cause-and-effect relationship. Subjects are usually measured before and after a treatment in a specially designed controlled setting such as a lab. One group being placed in an experimental group (the one being manipulated), while the other is placed in a placebo group (inert condition or non-manipulated group). Such experiments give a high level of control and reliability. Due to the difficulties of controlling all the factors influencing the dependent variable, experiments face threats to external validity of an investigation (Bryman 2012).

In contrast, for non-experimental study researcher observes the phenomena, as it occurs naturally without introducing any external variables, to establish associations between variables. The label defines the studies in which researchers cannot control, manipulate or change the IV or subjects, nevertheless, counts on interpretation, observation or interactions to conclude. Researchers collect data without making changes or introducing

any treatments. Researchers statistically control variables which are either related to IV or DV. Typically, researchers rely on correlations, surveys or case studies and cannot demonstrate a true cause-and-effect relationship. Organizational studies prefer non-experimental designs, such as survey questionnaires, as they don't require any implementation of controlled environment of experimental laboratories within organizational settings (Punch 2014). In addition, non-experimental designs tend to have high level of external validity, meaning it can be generalized to a larger population.

Non-experimental design is most appropriate choice for my research because the chosen IV, i.e. BiG5 personality traits, is unrealistic to be manipulated. Secondly, research is focused to find relationships between individual personality, their performance feedback-seeking behaviour and their docility rather than establishing any cause-effect relationship. Lastly, these relationships are hypothesized theoretically based on existing literature followed by supporting empirical studies.

3.3.3 Population and sample.

The aim is to study relationships between individuals psychological, cognitive and behavioural aspects within organizational settings, the sample comes from full time employed individuals working within UK based organizations. Hence, the sampling unit is an employee. Previous studies (e.g. Miller and Jablin 1991; Tidwell and Sias 2005; Morrison 1993) have focused on organizational newcomers who tend to seek frequent feedback to reduce uncertainty regarding various issues including task, relationships with new co-workers and performance. This study focuses on elements of docility which are developed overtime, such as influence of knowledgeable people in social network and socially distributed decision-making (Secchi 2011; Bardone and Secchi 2017). Therefore, unlike previous studies the sample of this study has no job tenure restrictions. The sample of the study has been collected from various industrial sectors of UK to avoid any

possibility of obtaining homogeneous population on common factors which could restrict generalizability of understanding research constructs. In order to make sure individuals had sufficient opportunity to exchange information with other employees, specifically co-workers from same team/department/division and a supervisor, the research restricted participants to be part of team of at least five members. This specification allowed to have a sample which represented a larger population. Findings from research sample should be interpreted with caution in terms of generalizability.

3.3.4 Use of Web-based survey provider.

Due to cost, access and time limitations, the questionnaire was administered and distributed by web-based survey provider, Respondi panel services (https://www.respondi.com/EN/). It is an international access panels and services provider, operating in London. It is an ISO-certified high quality of online panel provider. A web-based survey provider ensures quick, easy and inexpensive access to potential respondents (Goodman et al. 2013). It has got all the personal details of their recruited panels. Conducting an internet survey through it has facilitated low-cost and fast data collection from the target population (discussed below). I was not provided with any personal information through survey, either by respondent or the third party, which could identify individual respondent.

Using a web-based panel provider allowed me to obtain large sample which traditional techniques find challenging to collect (Gosling et al. 2004). However, this can be a problem as respondents are self-selected into the pool of respondents from the survey provider. The respondents get monetary compensation for completing surveys. The literature shows that monetary incentive helps in maximizing the response rate (e.g. King and Vaughan 2004) and the quality of data is not affected (Buhrmester et al. 2011). Research has shown similarities in reliabilities of both traditional and web based collected

data (Goodman et al. 2013). In addition, online surveys provide the highest level of convenience for the respondents because they can respond the questionnaire according to their own preferences, pace and chosen time. The responses were automatically stored in survey database, which provided a hassle-free handling of data and a smaller possibility of data errors. However, it is inevitable to have disadvantages of using online survey questionnaires as any other method. Firstly, survey fraud is a very common disadvantage where people answer online surveys just for monetary reward other than advancement of the research. This was eliminated by restricting respondents' characteristics and terms and conditions defined in the contract with the panel services provider. Duplication may occur if respondents try to submit questionnaires multiple times (Schmidt 1997). To avoid duplication, the company ensured that they do not seek responses from the same individual. Respondi verifies their respondents through email and their registered internet protocol (ip) address. All restrictions are programmed in their data collection system as well as their recruitment policy. Secondly, world wide web-based surveys could be accessed by unknown masses (Schmidt 1997) which was restricted by defining certain characteristics of respondents as well as the company has got all the personal details of their recruited panels (e.g. names, emails, or contact numbers) which avoided submission of survey by unwanted sample and was not open to public.

To avoid any ethical issues, the panel service provider took consent from the respondents. In addition, I provided concise information in introduction where it was mentioned that by completing the questionnaire one is consenting to take part in the study. Lastly, long questionnaires could cause the possibility of 'breakoff' (Markstedt and Vernersdotter 2013) or 'respondent-fatigue' also known as 'survey-fatigue'. This was addressed by carefully designing the questionnaire. The questionnaire was arranged onto multiple pages with different marked sections instead of a single long page, questions were in easy

and understandable language, and minimal presence of open-ended questions. This had somehow mitigated breakoff and fatigue. The questionnaire was strategically arranged in terms of providing questions related to dependent and independent variables on different pages. This assisted in avoiding any possibilities of respondents filling in the survey according to their social desire instead of genuine information (Bryman 2012).

In consideration of cost, the research required to collect 400 completed questionnaires. Then the sample would be large enough to carry out Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) for docility scale. The web-based data collection resulted in 408 respondents. EFA and CFA was conducted on the final usable data which was 408.

3.3.5 The choice of survey.

The use of survey is a commonly employed research design. The survey involves directly collecting information from the sample from population. Survey took account of people's personality traits (extraversion, conscientiousness, agreeableness, neuroticism and openness to Experience), their preference for feedback-seeking patterns (direct, indirect and reflective appraisal from supervisor and/or co-workers), and their docility. There are few demographic and control variables which are discussed in the next section. The study has used *self-administered* questionnaire developed through Qualtrics online questionnaire development tool. Online surveys are used in this study, which assisted in getting access to various organizations at a very low cost.

3.3.6 Layout of questionnaire.

Following Bryman's (2012) suggestion about spending some time on considering the design of questionnaire, a workshop was conducted which was open for PhD students and supervisors to share and gather some feedback on the design and layout of questionnaire. Brief introduction to the conceptual framework was presented followed by discussion on

methodology, specifically questionnaire design. The feedback helped in organizing the questions, changing wording of few questions (like question regarding team size), avoiding any typo errors, and including more control variables. The questionnaire is attached as Appendix 2.

As advised by Saunders et al. (2012) the research considered sequence and logical flow of questions which assisted in reducing common method bias (henceforth, CMB) and made the questions easy to follow for the respondents. CMB arises due to the presence of common method variance, which is the variance "attributable to the measurement method used rather than to the constructs" (Podsakoff et al. 2003, p. 879).

The questionnaire had a detailed introduction which described the purpose of the study and assured respondents that there were no right or wrong answers. It stated how long it will take to complete the questionnaire to encourage more people to complete it. It clarified respondents' discretion to take part in the survey and ensured their complete anonymity and confidentiality throughout the research. The introduction explained how the results of the research will be used followed by providing contact details in case of their interest in research result or any queries. It was made clear that respondents were free to discontinue their participation if they wish to do so. All these assurances mitigate the chances of answering the questions to be more social desirable and lenient (Podsakoff et al. 2003) as well as encouraged more participation. After the introduction, respondents are asked very easy to answer few demographic questions to motivate participants to proceed onto the next sections. The web-based survey tool had a function to randomize items for each run of survey. This helped to reduce priming effects and reduce CMB. To further check for any unengaged respondents, reverse coded items were included as well as an attention trap that requested the respondents "on this item please click strongly disagree". "Unengaged respondents" refer to those people who scored the same value for

most items across the whole questionnaire. In these cases, the assumption is made that the respondents completed the survey without engaging with the questions. Including these samples in the study could have significant effect on the conclusions that can be drawn from the data.

3.4 Measurement of the variables.

The following section provides a snapshot of the measures used for the first study. Chapter 4 has explained validity and reliability of measure of docility and FSB as they are newly developed and tested once on a different sample.

3.4.1 Feedback-seeking behaviour.

Participants were asked how frequently they sought feedback by using combination of straight forward questions, roundabout questions and through observation of the sources of feedback regarding their job performance. FSB was measured by using 12-items scale from Krasman (2010) which is originally based on Early et al. (1990) definition of performance feedback. Krasman's (2010) scale was used because it measures the information-seeking strategies which can improve performance and involve proactive socialization tactics. Most of the other feedback-seeking scales combine aspects like seeking technical information and social feedback (Ashford 1986; Morrison 1993; e.g. VandeWalle et al. 2000). The scale measured individual's frequency to seek outcome feedback (information concerning performance outcome) and process feedback (information concerning the methods/ways an individual implement to work) from supervisors and co-workers.

The measure included six scales, three for each source of feedback: direct inquiry of performance feedback from supervisors, indirect inquiry of performance feedback from supervisors, reflective appraisal of performance feedback from supervisors, direct inquiry of performance feedback from co-workers, indirect inquiry of performance feedback

from co-workers, and reflective appraisal of performance feedback from co-workers. Each scale had two items. One item reflected seeking outcome feedback and the other item reflected seeking process feedback. The responses were obtained on a five-point Likert scale from 1 (very infrequently) to 5 (very frequently). A sample item of measuring outcome feedback from supervisor is, 'In order to determine whether the results of your work are correct, how often do you… ask your supervisor directly?' For this dataset, the reliability coefficient was .907. The complete list of items measuring FSB is provided in next chapter in Table 4.1. The scale was tested for reliability and validation with a UK sample, details are included in chapter 4.

3.4.2 Personality.

Personality was measured by using 44-items scale developed by John and Srivastava (1999). The big five inventory (BFI) represent personality at the broadest level of abstraction, and each dimension recapitulates many distinct, more specific personality characteristics. The BFI shows high convergent validity with other self-report scales and with peer ratings of the Big Five. Each dimension was measured through 8 to 10 statements. All items were rated on a five-point scale where 1 equals strongly disagree, 2 equals disagree, 3 equals neither agree nor disagree, 4 equals agree, and 5 equals strongly agree. Sample item for measuring individual extraversion include *'I see myself as someone who … is full of energy'*. Likewise, for conscientiousness sample item include *'I see myself as someone who…perseveres until the task is finished'*. For this dataset, the reliability coefficient was .783. The complete list of items is included as part of the research questionnaire's section 2 in Appendix 2.

3.4.3 Docility.

Docility was measured using 14-item scale developed by Secchi (2017a). This measure weighs five dimensions embedded in concept of docility and was developed using

empirical results from Danish sample. This was the initial step in the development of first ever tool to measure the level of individual docility within organizations as the discussion about the construct in organizational context has recently started long after its inception. Respondents were asked to indicate their level of agreement or disagreement to the statements considering their selves as part of a team. A five-point Likert interval response scale from 1 (strongly disagree) to 5(strongly agree) was used. For this dataset, the reliability coefficient was 0.901.

The corresponding scales of docility are as follows:

3.4.3.1 Role of knowledge (ROK): This dimension measures respondents' level of agreement indicating believe in using multiple knowledgeable sources when taking advice. The dimension is measured through three items including item like, "I listen to more than one opinion when making tough decisions".

3.4.3.2 Sociability and learning environment (SLE): This dimension measures individual's level of agreement on how often they learn from each other in a team and whether they use cooperation for completion of their daily tasks. This is measured by two items including, "In our team, we learn from each other very often".

3.4.3.3 Responsibility, Liability and Community (RLC): This dimension measures how much individual participates in organizational activities and likes meeting others to help them. It also measures how often an individual tends to spend time to understand other people's concerns and problems at work. It is measured by four items including items like, "I feel good when I meet with other people at work".

3.4.3.4 Socially distributed decision-making (SD_DM): This dimension measures active side of docility as it indicates how much individual assist others at work in making their decisions and solving their problems. SDDM was measured through three items including item like, "People come to me to help solve problems".

3.4.3.5 Information sharing (ISH): This dimension measures both passive and active sides of docility by indicating level of agreement on how often one shares information with others at work and whether people enjoy sharing information with them. It is measured by two items including, "I always share information with other people at work" and "Many people enjoy sharing information with me".

3.4.4 Measurement of demographic and control variables.

The section 1 of the survey was dedicated to questions related to respondents' demographics and few control variables. Information about respondents' gender and age were measured with single items. Respondents' level of education was measured with the following item: "What is the highest level of education you have complete?" Respondents rated their level using 9-point scale where 1 equals *grammar school*, 6 equals *master's degree* and 9 equals *other*. Current job tenure was measured using 5-point scale where 1 equals *less than 6 months* and 3 equals *between 1 and up to 3 years* and 5 equals *more than 5 years*. To know if respondents had any supervisor or line manager at work a *Yes/No* question was asked. Similarly, to know if the respondent had any supervisory role a *Yes/No* question was asked. Respondents' being part of a team was measured with the following item: "When at work you normally work...." where 1 equals *alone* and 6 equals *larger than 5 members*.

More detail on control variables in provided in chapter 4 (section 4.2.5) as part of the empirical study. Descriptive statistics for the main variables and control variables is provided in chapter 4 (Table 4.10). The table provides the mean, standard deviation, correlations and reliability of each of these variables. In addition, chapter 4 includes detail tests for validity and reliability of measures of docility and FSB for further data analysis.

3.5 Methods used for data analysis: Study 1.

Before data analysis, I carried out data screening checks to ensure that the data is clean. First, I checked for any missing data. There were no missing responses in the data set. Univariate Outliers are analysed through box plots. As I have used Likert-scales (5 point), getting responses at the extreme (1 or 5) do not really represent outlier behaviour. The final sample consists of 408 respondents who passed the attention check and thus showed full engagement.

For the survey-based study, the data analysis is carried out using OLS regression to test hypothesis defining relationships between individual feedback-seeking strategies and the BiG5 personality traits. To uncover the boundary conditions for the association between personality (Independent Variable = IV) and FSB (dependent = DV) moderated by docility (moderator = M), I have conducted moderation analysis by using Hayes's (2013) PROCESS macro package which estimates moderation in SPSS. The interaction terms were formed by multiplying mean-centered independent variables (IV and M) as recommended by Cohen et al. (2003). The mean-centering approach is used to eliminate any multicollinearity issues. PROCESS automatically mean centres all the independent variables involved in interaction effect. Moderated regression analysis seeks to determine the change in R^2 that results during a hierarchical test of two regression equations. Moderation analysis using OLS has two major parts. First, it allowed me to test if there is sufficient evidence that the relationship between IV and the DV depends on M. After finding the evidence, I have probed the interaction to understand how the effect of IV on DV looks and behaves along the range of the M. All the independent variables (IV and M) involved in the interaction are mean centred for increasing interpretability preventing problems with multicollinearity.

Once an inferential test of moderation is completed and evidence of moderation is found, I have looked for the nature of the moderated effect. For what values of M does IV negatively influence DV, and for what values of M does IV positively influence DV? When M is at its mean, does IV significantly predict DV? When M is at its low or high levels does IV significantly predict DV? Questions like these are related to conditional effects, the effect of IV on DV conditional on some value of M. Such questions can be addressed by "probing" interactions for which I have used PROCESS. The section below will discuss two frequently used methods for probing an interaction which are used in the study presented in chapter 4: Simple-slopes Analysis and the Johnson-Neyman Technique.

3.5.1 Simple-slopes Analysis.

Simple-slopes analysis, also called pick-a-point approach, is a method for estimating and testing conditional effects to answer the question: When M is equal to some value, say *m*, what is the effect of IV on DV? Simple slopes analysis depends on the estimate of the conditional effect of IV on DV and its standard error. Picking points along M to probe the relationship between IV and DV is often arbitrary. As M is a continuous variable, the choice is more arbitrary. On Hayes (2013) recommendation, I have probed along the percentiles of M (10th, 25th, 50th, 75th, and 90th percentile) to guarantee that all probed points are within the range of the observed data on the moderator. However, I have selected 25th, 50th and 75th points (quartiles) to present and discuss the slopes. These are labelled as representative of "low", "moderate", and "high" quartiles in the sample. The result gives a location of the score in the sample distribution of M and whether the percentile value can predict the relationship between X and Y. PROCESS generates the output automatically from the pick-a-point approach to probing interactions whenever a moderation model is specified with IV's effect on DV moderated by any variable.

3.5.2 Johnson-Neyman Technique.

The second method for probing interaction is Johnson-Neyman Technique which does not rely on choice of arbitrary points. Instead, this method classifies points along a continuous moderator where the conditional effect of IV on DV changes from statistically significant to non-significant or vice versa. JN technique has produced two solutions for M, referred below as $M1_{JN}$ and $M2_{JN}$ where $M1_{JN} \leq M2_{JN}$. These points along M demarcate the region where the conditional effect of IV on DV is exactly statistically significant at given level of significance. These values of M identify the "region of significance" of the effect of IV on DV (Hayes, 2013). The JN technique gave two possible outcomes; first it gave two solutions within the range of the data and second it gave no solutions within the range of the moderator.

3.5.2.1 Two solutions within the range of the moderator.

Most of the outcomes identified region of significance of IV's effect on DV as $M1_{JN} \leq M \leq M2_{JN}$ as well as $M \leq M1_{JN}$ and $M \geq M2_{JN}$. The former describes that the conditional effect of IV on DV is statistically significant when M is between $M1_{JN}$ and $M2_{JN}$ but not beyond these two values. The latter means that the conditional effect of IV on DV is statistically significant when M is less than or equal to $M1_{JN}$ and when M is greater than or equal to $M2_{JN}$ but not in between these two values. I have provided the outcomes in the regression tables.

3.5.2.2 No solution within the range of the moderator.

There are many occasions when there was no solution. An outcome where there is no solution means either of the two possibilities. First, the conditional effect of IV on DV is statistically significant across the entire range of M. Second, the conditional effect of IV on DV is not statistically significant anywhere in the observed distribution of the M. In both scenarios, there are no points of transition. In the first case, the region of significance

of the effect of IV on DV is the entire range of M, and in the second there is no region of significance. In both cases, PROCESS gave a message in output stating that, "There are no statistical significance transition points within the observed range of the moderator".

The next chapter 4 presents focused information on results of regression analysis defining relationships between individual feedback-seeking strategies and the BiG5 personality traits followed by moderation analysis to uncover the role of docility in these relationships. All hypothesized relationships are discussed under the heading of single personality trait. Whereas, the discussion includes relationship of each personality trait with each feedback-seeking strategy and how docility influences the relationship.

3.6 Agent based modelling: Study 2.

I explore the effects of organizational characteristics ─ including organizational structure, cost of seeking information, cost of sharing information, and range of interaction ─ on emergence of docility using agent-based modelling (ABM). Modelling is the process of building an abstraction of a system (e.g. social system, like organization) for a specific purpose. A model is an abstraction of what is being modelled: perhaps retaining only certain features and properties that are considered relevant; maybe making assumptions about unknown aspects; maybe simplifying aspects; maybe exploring occurrence of certain aspects. Models may be developed for a wide variety of purposes; my model is one of those which aim to produce an essentially "correct" representation of the causes behind observed phenomena or to predict outcomes from given conditions. Thus, it is assumed that the behaviour of a model is somehow comparable to what is being modelled. Of course, in many cases, things are not directly modelled but rather an abstraction of the target is modelled. The philosophy of ABM is summarized in the next section.

3.6.1 Philosophy of ABM.

A simulation attempts to show the nature of a model as it changes over time. Therefore, it can be said that a simulation is a representation of a model and not directly a representation of reality. Instead, it is the model's job to attempt to represent some level of reality in a system. In this case, it would appear that a simulation's ability to represent reality depends upon the model upon which it is built. In a nutshell, a simulation is created within a computer and is a representation of a model which is a representation of a real system. A model can never be as real as the actual system and that instead all that can be hoped for is that the model is at least capable of representing some smaller elements of the real system.

3.6.2 Choice of ABM.

The choice of using ABM is based on two interdependent questions: First is, what I want to study? And second is, what methods are available to study it? Firstly, as mentioned earlier, the aim is to study what happens to docility, does it emerge, stabilize or disappear when there are changes in certain organizational factors? What happens to docility when organization imposes high costs by discouraging social interactions dedicated for cooperative behaviours? Basically, the study needs to observe social interactions between heterogeneous individuals who are different because of their docility and understand what comes out of those interactions under certain organizational circumstances. Interaction is particularly relevant for the study of individual docility as it is the way individuals exchange information and show their willingness to be influenced by the social resources in a given environment (Secchi 2011).

Secondly, ABM is a computer simulation technique that has seen upsurge in use by social scientists (e.g., Bardone and Secchi 2017; Boari et al. 2017; Fioretti 2013, 2015; Herath et al. 2017; Secchi and Neumann 2016; Thomsen 2016). The properties of ABM have

been recently explored in relation to individual's docile behaviour (Bardone and Secchi 2017; Secchi 2016; Thomsen 2016) where authors develop the models on the basis of cognitive altruistic interactions giving the model a very specific socio-cognitive dimensions based on docility. ABM opens doors to understand complexities present in organizational environment (Miller and Lin 2010) and is specifically suitable to represent the complex system of socially distributed decision-making. Hence, ABM fitted in beautifully to study docility as I could see no other adequate analytical approach to observe social interactions between heterogeneous group of individuals and the outcome of those interactions in the form of change in docility. The use of ABM has offered advancement in the concept of docility by allowing to experiment large range of parameters and value variations pertaining to individual and organizational factors.

3.6.3 Features of ABM.

The most important thing ABM provides is its's flexibility, which has helped me to manage three particular challenges that complexity of docility brought in such as, heterogeneity, spatial structure, and adaptation.

3.6.3.1 Heterogeneity: ABM is an approach to modelling complex systems composed of interacting, autonomous 'agents' (Macal and North 2010; Secchi 2017b). ABM allows rich representation of heterogeneity. Using ABM allowed me to model heterogeneous agents who represent different types of docility, who differ in their attributes and also change their attributes after interacting and being influenced by other agents. During interactions agents exchange informational messages which become source of learning for them; assisting them in acting. These messages can carry information about interacting agent's characteristics or information unveiling the effects of other agent's actions. "The possibility of modelling such agent-to-agent interaction is the main way in

which agent-based modelling differs from other types of computational models" (Gilbert 2008: 6).

3.6.3.2 Spatial Structure: ABM has allowed me to represent a model of structurally rich and dynamic social system of organization where social interactions between heterogeneous agents occur by following certain rules of interactions. The agents link with each other in a formal organizational structure by following rules of hierarchy. The agents also show change in their behaviour under certain social influence.

3.6.3.3 Adaptation: The ABM technique is particularly brilliant at modelling interaction and adaptation. In the model, agents interact with other agents while passing information about their fitness as well as observing another agents' fitness in their surrounding and adapt to the favourable and fittest attitude. This depicts individual's openness to be influenced by the social system and is modelled through concept of docility. If agent's fitness is lower than the fitness of agents in their surrounding they copy the fittest behaviour for their survival.

As ABMs are dynamic, individual-level *adaptation* can also be represented, as in my model agent changes its behaviour with respect to certain organizational changes and adapts to the system by bringing change in their docility. ABM has allowed to replicate components of the real phenomenon of docility by creating a computational environment (i.e. organizational workspace) where agents (employees) having different attributes e.g. *need for information-seeking (nfIS)* and *quality of information (qoI)* interact and behave per set rules depending on organizational structure.

The emphasis on modelling the heterogeneity of agents across a population and the emergence of self-organization are two of the major distinguishing features of ABM as compared to other simulation techniques, like system dynamics and discrete-event simulation. To summarize, ABM has proven to be more flexible and adaptable than

mathematical, structural equations or differential equations as it offers the possibility of simulating individual heterogeneity and placing agents in a geographical space replicating the real environment (Gilbert and Terna 2000; Gilbert 2008). It has allowed to observe the outcome of interactions within organization which is very complex to observe. Studying interactions and their outcome can provide us the understanding of which type of individual has more chances of increasing their fitness in organizational environment. From the literature and assumptions, it is straightforward that highly docile will fit in the environment better than any other type of individuals. However, it is interesting to test the theory with additional attributes and types of agents through ABM. The research focuses on process of interaction between heterogeneous agents creating docility effect which influence others in the system. By modelling the effects of docility on individual varying *nfIS* from other individuals and *qoI* shared in the social system under two different scenarios, an understanding of how and why docility appears or diminishes can be gained.

All the features of ABM brought the study closer to what I wanted to understand. The following section describes the language I have used to develop my ABM to study docility.

3.6.4 Netlogo.

I have used Netlogo 5.2 (Wilensky 1999) to implement the model with heterogeneous agents appearing in the space (organization) at random and interacting with each other according to the defined rules. Netlogo is a very popular agent-based simulation environment (Wilensky 1999). The modelling language is "Netlogo". Its interface is user-friendly and allows using built-in features including switches, slider, and graphs as required. The model has used 'switch' to on and off the scenarios of formal and informal organizational structure, 'sliders' to define initial number of different types of agents, cost

of seeking rate and cost of sharing rate, as well as for defining range. Netlogo is a multi-agent programmable modelling tool developed by The Center for Connected Learning and Computer-Based Modelling at Northwestern University in Evanston. IL (Wilensky 1999). The ABM comprised of the features important to study this phenomenon as intentional simplification is strongly recommended in modelling approaches (e.g. Gilbert 2008). It means that the model focused on characteristics of heterogeneous agents appearing in the space (organization) at random and interacting with each other according to the defined rules while it is agnostic about other features of the agents.

Upon completion, the model was checked to remove any bugs (errors) and tested by running several times to determine if the model was serving the purpose and was producing consistent results over multiple experiments. The experiments have the potential to provide some meaningful information regarding the influence of organizational structure and other conditions for docility to emerge, stabilize or disappear within organizational environment. I can find if individual's docile attitude (information-seeking and sharing from others) depends on the organizational structure, cost of sharing information or it relies on individual's fitness. If the findings show that docility is independent of these conditions, then this concept is far stronger than what Simon and other researchers of docility have highlighted in the previous studies.

3.6.5 Tools and methods used for data analysis: Study 2.

For the statistical analysis of the data obtained through experiments, I have used an open source software called RStudio (R Core Team 2013). Results are presented using plots and co-plots for different combinations of conditions by setting values for range (3, 5, 7) and cost of seeking information and sharing information (0, 1, 2). The co-plots assist in analyzing the effect on the parameter held constant when the other two parameters differ. This is a standard way of presenting results for simulation-based studies. I have also

conducted t-tests to show that results are significantly different when the values of range and cost of seeking information as well as sharing information are changed under formal and informal organizational structures. To avoid any duplication, rest of the logical and technical aspects are discussed in detail in chapter 5 which is dedicated to simulation-based study.

3.7 Summary.

This chapter discussed the differences between the main three research paradigms addressing three fundamental questions defined under headings of ontological, epistemological, and methodological prescriptions that guide the research process. The chapter provided the reasons why post-positivism is appropriate for this research. Considering the research questions and the choice of research paradigm, a quantitative approach was adopted for this research.

To answer first research questions, a survey questionnaire was chosen as tool for data collection through a web based third party. Layout of the questionnaire and main variables were discussed. Steps to prepare data for further analysis were discussed. The reliability and validity of scales for measuring main variables will be carried out in the next chapter, followed by regression and moderation analysis for testing the hypothesis. To address the second research questions, an agent-based modelling approach was chosen. A brief introduction to ABM was made. The reasons behind the choice were discussed.

As mentioned earlier, I have followed the best practices as recommended by Field (2013, 2018), Bryman (2012) and Bryman and Bell (2015) to meet standard levels of precision in research design and analysis.

Chapter 4: Investigating the moderating effects of docility on the relationship between personality and feedback-seeking behaviour.

4.1 Introduction.

This chapter empirically assesses how docility affects the relationship between personality and FSB (Conceptual model presented in chapter 2). Before the regression analysis, I have discussed measurement of the main variables and analytical strategy. A brief overview of the scales used to measure main variables including BiG5 personality traits, FSB, docility and control variables is provided. There is a possibility of some duplication as a brief introduction to measures was provided in the previous chapter. The steps taken for data screening and factor analysis of the scales measuring docility and FSB are presented. EFA is conducted before CFA of docility. In order to detect CMB, I have conducted two tests: Harman's single factor and a Common Latent Factor (CLF) method using the zero-constrained test. The chapter presents the analysis of the relationships between personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism and OTE) and FSB under the presence of docility. Drawing on the theoretical effect of docility, I argue that docility has an impact in moderating the relationship between FSB and individual personality traits. The conceptual model posited that individual personality plays vital role in choosing feedback-seeking strategies (direct, indirect and reflective appraisal) which further defines their FSB. Nonetheless, very limited empirical research has been carried out to explore and support this important theoretical insight. Empirically recognizing the relationships between BiG5 personality traits, FSB and docility can shed light on how managers can identify and improve their staff's feedback-seeking behaviour and docility. The findings can assist organizations in identifying formal rules and informal norms to support docility and encourage proactive feedback-seeking. I have provided few extra regression tables to discuss some non-hypothesized relationships which can be of value for future research.

4.2 Measurement of main variables.

The following sections describe the measures used to collect data through survey. I chose to conduct EFA on FSB and docility scales as it is designed "for the situation where the links between observed and latent variables are unknown and uncertain" (Byrne 2009:5). EFA is a fundamental component of structural equation modelling as it explores the inter-relationships among variables to identify if those variables can be grouped into a smaller set of underlying constructs. Conducting EFA has helped in identifying the underlying latent constructs for FSB and docility (Kim and Mueller 1978; Norris and Lecavalier 2010).

4.2.1 Feedback-seeking behaviour (FSB).

The dependent variable (DV), feedback-seeking behaviour, was measured by using the 12-item scale from Krasman (2010) which is originally based on Earley et al. (1990) definition of performance feedback. Krasman's (2010) scale was used as it measures the information-seeking strategies involving social interaction through verbal and observational methods. Most of the other feedback-seeking scales combine other aspects like seeking technical information, reference information, normative information, and social feedback (Ashford 1986; Morrison 1993; e.g. VandeWalle et al. 2000). The scale measured individual's frequency to seek outcome feedback (information concerning performance outcome) and process feedback (information concerning the methods/ways an individual implement to work) from supervisors and co-workers.

The measure included six factors: direct inquiry of performance feedback from supervisors, indirect inquiry of performance feedback from supervisors, reflective appraisal of performance feedback from supervisors, direct inquiry of performance feedback from co-workers, indirect inquiry of performance feedback from co-workers,

and reflective appraisal of performance feedback from co-workers. Each factor had two items. One item reflected seeking outcome feedback and the other item reflected seeking process feedback. The responses were obtained on a five-point Likert scale from 1 (very infrequently) to 5 (very frequently). A sample item is, '*In order to determine whether the results of your work are correct, how often do you ... ask your supervisor directly?*' The scale was tested for reliability and validation with a UK sample. The complete list of items measuring FSB is provided in Table 4.1 below.

Table 4.1 Complete list of items measuring individual feedback-seeking behaviour.

Dimensions	Item code	Item description
Direct Inquiry from Supervisor	OFS1	Ask your supervisor directly?
	PFS1	Ask your supervisor directly?
Indirect Inquiry from Supervisor	OFS2	Ask your supervisor indirectly (e.g. by using hinting, joking, roundabout questions)?
	PFS2	Ask your supervisor indirectly (e.g. by using hinting, joking, roundabout questions)?
Reflective Appraisal from Supervisor	OFS3	Pay attention to how your supervisor treats you?
	PFS3	Pay attention to how your supervisor treats you?
Direct Inquiry from Co-worker	OFC1	Ask your co-workers directly?
	PFC1	Ask your co-workers directly?
Indirect Inquiry from Co-worker	OFC2	Ask your co-workers indirectly (e.g. by using hinting, joking, roundabout questions)?
	PFC2	Ask your co-workers indirectly (e.g. by using hinting, joking, roundabout questions)?
Reflective Appraisal from Co-worker	OFC3	Pay attention to how your co-workers treat you?
	PFC3	Pay attention to how your co-workers treat you?

OFS=Outcome feedback from supervisor, PFS= Performance feedback from supervisor, OFC= Outcome feedback from co-worker, PFC= Performance feedback from co-worker.

To conduct an EFA, I chose maximum likelihood as it maximizes differences between factors and offers model fit estimates. For factor rotation, I have used varimax as it tries to maximize the dispersion of loading within factors (Field 2018). Therefore, it attempts to load a smaller number of variables highly onto each factor resulting in more interpretable clusters of factors. Prior to EFA, I carried out analysis of the correlations among the items.

The data matrix in Table 4.2 showed substantial number of correlations greater than .30 among variables, indicating towards underlying common dimensions among the variables.

Table 4.2 Correlation matrix of items measuring FSB.

	OFS1	OFS2	OFS3	PFS1	PFS2	PFS3	OFC1	OFC2	OFC3	PFC1	PFC2	PFC3
OFS1	1	.497**	.425**	.791**	.428**	.410**	.554**	.324**	.318**	.475**	.277**	.333**
OFS2	.497**	1	.294**	.480**	.814**	.293**	.330**	.663**	.203**	.268**	.595**	.269**
OFS3	.425**	.294**	1	.489**	.275**	.800**	.370**	.225**	.568**	.330**	.205**	.562**
PFS1	.791**	.480**	.489**	1	.529**	.514**	.586**	.352**	.379**	.548**	.341**	.421**
PFS2	.428**	.814**	.275**	.529**	1	.345**	.314**	.681**	.256**	.348**	.683**	.303**
PFS3	.410**	.293**	.800**	.514**	.345**	1	.376**	.263**	.671**	.367**	.225**	.669**
OFC1	.554**	.330**	.370**	.586**	.314**	.376**	1	.479**	.472**	.750**	.415**	.494**
OFC2	.324**	.663**	.225**	.352**	.681**	.263**	.479**	1	.376**	.442**	.805**	.347**
OFC3	.318**	.203**	.568**	.379**	.256**	.671**	.472**	.376**	1	.452**	.292**	.838**
PFC1	.475**	.268**	.330**	.548**	.348**	.367**	.750**	.442**	.452**	1	.514**	.558**
PFC2	.277**	.595**	.205**	.341**	.683**	.225**	.415**	.805**	.292**	.514**	1	.376**
PFC3	.333**	.269 **	.562**	.421**	.303**	.669**	.494**	.347**	.838**	.558**	.376**	1

** Correlation is significant at the 0.01 level (2-tailed).

OFS=Outcome feedback from supervisor, PFS= Performance feedback from supervisor, OFC= Outcome feedback from co-worker, PFC= Performance feedback from co-worker.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was considered meritorious (0.808), which implies that the patterns of correlations were relatively compact which can assist EFA to yield distinct and reliable factors (Kaiser 1974). The

Bartlet's test of sphericity, which compares correlation matrix to an identity matrix (matrix with 1 on principal diagonal and zeros in all other correlations), χ^2 (66) = 3972.722, $p < .001$, indicated that correlations between items were fine enough for EFA (Hair et al. 2010). Communalities, which is the measure of the proportion of variance explained by the extracted factors, of all items were closer to 1 which indicated that the factors were good enough to explain the original data.

All items loaded on factors with eigenvalues over 1 (Kaiser criterion), whereas in contrast to the original scale (Krasman 2010), where items loaded on three factors, the pattern matrix showed four factors which explained 76.6% of the total variance. The pattern matrix (Table 4.3) shows that items related to each scale loaded highly onto separate factors, except questions related to direct feedback-seeking strategy loaded on separate factors depending on whether the feedback is sought from supervisor or co-worker. This shows that the factors do not share common elements which already reflected in the conceptual framework. For example, respondents were asked to identify their frequency of direct feedback inquiry from supervisors through two questions. First, in order to determine whether the *results of your work* are correct, how often do you, "Ask your supervisor directly?" and second, in order to determine whether the *methods you are using* to carry out your work are correct, how often do you, ask your supervisor directly? Similarly, respondents had to reply to the same questions, but the source of information had to be co-worker and not the supervisor. Hence, the resulting factor analysis showed presence of the four scales related to seeking feedback at work: *indirect inquiry from supervisor and co-worker, reflective appraisal from supervisor and co-worker, direct inquiry from supervisor, and direct inquiry form co-worker*. Items measuring indirect inquiry of outcome and process feedback from supervisor and co-worker load on the same factor (factor 1– Indirect Inquiry). Items measuring reflective appraisal of outcome and

process feedback from supervisor and co-worker load on the same factor (factor 2-Reflective Appraisal). Whereas, as mentioned above, the items measuring direct inquiry of outcome and process feedback from supervisor load on a separate factor (factor 3-Direct inquiry from Supervisor) than the items measuring direct inquiry of outcome and process feedback from co-worker (factor 4- Direct Inquiry from co-worker). This represents that seeking direct feedback from supervisor is a separate factor and does not relate to seeking direct feedback from co-workers. The Cronbach's alpha reliabilities of the scales met the criteria of most referenced threshold 0.75 (Hair et al. 2010).

As shown in Table 4.4, the reliability coefficient for indirect inquiry from supervisor and co-worker is .91, for reflective appraisal from supervisor and co-worker the value is .90, for direct inquiry from supervisor it is .88, and for direct inquiry from co-worker the Cronbach alpha is .86. For this dataset, the reliability coefficient for FSB was .796.

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Table 4.3 Exploratory factor analysis of FSB

Pattern Matrix[a]

		Factor			
		1	**2**	**3**	**4**
Indirect inquiry from supervisor and co-worker	Ask your supervisor indirectly (e.g. by using hinting, joking, roundabout questions)? OFS2	.823			
	Ask your supervisor indirectly (e.g. by using hinting, joking, roundabout questions)? PFS2	.866			
	Ask your co-workers indirectly (e.g. by using hinting, joking, roundabout questions)? OFC2	.827			
	Ask your co-workers indirectly (e.g. by using hinting, joking, roundabout questions)? PFC2	.816			
Reflective appraisal from supervisor and co-worker	Pay attention to how your supervisor treats you? OFS3		.754		
	Pay attention to how your supervisor treats you? PFS3		.872		
	Pay attention to how your co-workers treat you? OFC3		.845		
	Pay attention to how your co-workers treat you? PFC3		.790		
Direct inquiry from supervisor	Ask your supervisor directly? OFS1			.788	
	Ask your supervisor directly? PFS1			.772	
Direct inquiry from co-worker	Ask your co-workers directly? OFC1				.732
	Ask your co-workers directly? PFC1				.784

Extraction Method: Maximum Likelihood.
Rotation Method: Varimax
 a.   Rotation converged in 5 iterations.
Loadings lower than 0.30 were omitted.

OFS=Outcome feedback from supervisor, PFS= Performance feedback from supervisor,
OFC= Outcome feedback from co-worker, PFC= Performance feedback from co-worker.

Scale means in the current sample are given in the following Table 4.4. Mean of indirect

inquiry from supervisor and co-worker is lowest among the other strategies i.e. (mean =

2.47, SD = .944) which suggests that majority of the respondents may not like seeking

feedback through hinting, joking, or roundabout questions. Whereas, reflective appraisal

from supervisor and co-workers has highest mean (i.e. mean = 3.57, SD = .939), which

shows that respondents may like to seek feedback through observational methods rather

than verbal. In addition, looking at the mean values of direct inquiry methods, respondents

showed their likeness to seek direct feedback from co-workers (mean =3.20, SD = .996). Whereas, likeness to seek direct feedback from their supervisors has mean = 3.06, and SD = 1.072. Following Table 4.4 shows means, standard deviation, reliability co-efficient and eigen values of the scales.

Table 4.4 Mean, standard deviation, Cronbach's alphas and eigen values of feedback-seeking scale for N = 408

Factors	Mean	Standard Deviation	Cronbach's Alpha	Eigen value
Indirect inquiry from supervisor and co-worker	2.469	.943	.91	5.951
Reflective appraisal from supervisor and co-worker	3.574	.938	.90	1.962
Direct inquiry from supervisor	3.197	.996	.88	1.150
Direct inquiry from co-worker	3.064	1.072	.86	1.071

4.2.2 Personality traits.

The personality traits (extraversion, agreeableness, conscientiousness, neuroticism and openness to experience) were measured through "The Big Five Inventory" developed by John and Srivastava (1999). The big five inventory (BFI) represent personality at the broadest level of abstraction, and each dimension recapitulates many distinct, more specific personality characteristics. The BFI shows high convergent validity with other self-report scales and with peer ratings of the Big Five. The BFI is a well -established scale and used in a multitude of studies (e.g. Alkış and Taşkaya 2015; Yang 2017), therefore it was decided to not run an EFA as scale is reported to possess adequate internal consistencies ranging from 0.75 to 0.90 (John and Srivastava 1999). Each dimension was measured through 8 to 10 observed items making a total of 44 items. All items were rated

on a five-point Likert scale. Items involve questions about typical behaviours, for example, for measuring individual extraversion item include *'I see myself as someone who … is full of energy'*. Likewise, for conscientiousness sample item include *'I see myself as someone who…perseveres until the task is finished'*. Complete list of items is provided as part of questionnaire attached in Appendix 2. For this dataset, the reliability coefficient was .783.

The following Table (4.5) describes mean, standard deviation and Cronbach alphas of the five variables measuring big five personality traits. The Big Five Inventory (BFI) had the following means and standard deviations: extraversion (mean = 3.25, SD = .743), agreeableness (mean = 3.78, SD = .566), conscientiousness (mean = 4.05, SD = .578), neuroticism (mean = 2.87, SD = .646) and openness to experience (mean = 3.44, SD = .567). The Cronbach's alpha reliabilities of the scales met the criteria of most referenced threshold 0.75 (Hair et al. 2010) and mirrored the findings of John and Srivastava (1999). In the current sample, values of Cronbach's alpha were as follows: for extraversion (α =.85), agreeableness (α = 0.79), conscientiousness (α = .83), neuroticism (α = .76) and openness to experience (α = .78).

Table 4.5 Mean, standard deviation and reliability coefficients of the Big Five Personality Traits for N = 408

Factors	Mean	Standard Deviation	Cronbach's Alpha
Extraversion	3.25276	.742975	0.85
Agreeableness	3.77505	.565801	0.79
Conscientiousness	4.04711	.577892	0.83
Neuroticism	2.87132	.645804	0.76
OTE	3.44167	.567056	0.78

OTE = Openness to experience

4.2.3 Docility.

This study measures individual level of docility through their perception. Docility was measured using 14-item scale developed by Secchi (2017a) as presented in Table 4.6. The table shows five scales/dimension, embedded in concept of docility including role of knowledge (RK), sociability and learning environment (SLE), responsibility liability and community (RLC), socially distributed decision-making (SD_DM), and information sharing (ISH). Each dimension was measured through two to four statements. The scale was developed using empirical results from a mix of U.S., U.K., and Danish samples. This was the initial step in the development of the first ever tool to measure the level of individual docility within organizations; the discussion around the concept as it applies to an organizational context has only recently started, long after its introduction. The reliability co-efficient of the scales as measured by Secchi's (2017a) study are presented in the last column of Table 4.6. Respondents were asked to indicate their level of agreement or disagreement to the statements considering themselves as part of a team. A five-point Likert interval response scale from 1 (strongly disagree) to 5 (strongly agree) was used. A sample item for role of knowledge includes, *'I lean towards knowledgeable individuals when taking advice'*. For information sharing, a sample item is, *'Many people enjoy sharing information with me'*.

I elected to carry out an EFA with maximum likelihood as it maximizes differences between factors and offers model fit estimates and promax rotation prior to running CFA. EFA is used to explore how the variables were related and grouped prior to further analysis. This was deemed necessary because the scale is newly developed as well as was originally tested on a varied but limited dataset. The complete list of original items measuring docility along with the reliability co-efficient calculated by Secchi (2017a) are provided in Table (4.6).

Table 4.6 Complete list of items measuring individual docility and values of Cronbach Alphas.

Dimension	Item code	Item description	Cronbach Alpha (Secchi 2017a)
Role of Knowledge (RK)	DRK1	I believe that knowledge plays an important role when taking advice.	0.57
	DRK2	I lean towards knowledgeable individuals when taking advice.	
	DRK3	I listen to more than one opinion when making tough decisions.	
Sociability and Learning Environment (SLE)	DSLE1	In our team/ department/division, we learn from each other very often	0.71
	DSLE2	Our team/department/division, uses cooperation to accomplish daily tasks.	
Responsibility Liability and Community (RLC)	DRLC1	In my team/department/division, we always discuss goals and objectives.	0.71
	DRLC2	I feel responsible to the team/department/division for what I do in my job.	
	DRLC3	I feel good when I meet with other people at work	
	DRLC4	I often spend time to understand other people concerns, problems, or else.	
Socially Distributed Decision-making (SD_DM)	DSDDM1	I make people feel comfortable when at work	0.68
	DSDDM2	People come to me to help solve problems	
	DSDDM3	I usually help people to make decisions	
Information Sharing (ISH)	DISH1	I always share information with other people at work.	0.60
	DISH2	Many people enjoy sharing information with me	

DSLE= Sociability and learning environment, DRLC= Responsibility liability and community,
DSDDM= Socially distributed decision-making, DRK=Role of knowledge,
DISH= Information sharing.

Factor analysis allows to look for common underlying dimensions within my data and for that I was mainly interested in the common variance (Field 2009). Items were examined for their proportion of common variance (between 3.80 to .791, known as communality) which determined their proportion of variance in the variable explained by each of the

items. The Kaiser criterion, of eigenvalue greater than 1 (Kaiser 1960), was used which resulted in extraction of three factors (Table 4.7). Items measuring RLC and ISH were cross loading on multiple factors. Due to low reliabilities and cross loadings, I eliminated items measuring ISH. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy value was .877, which falls into the range of being great (Hutcheson and Sofroniou 1999). This means that sample size is adequate for factor analysis. The Bartlett's test came highly significant ($p < .001$), showing that there are some relationships between the variables which are being analysed, and therefore factor analysis is appropriate. There was acceptable goodness of fit (Chi-Square = 164.599, df = 33) and the total variance explained was 52.67%.

Items measuring RLC and SLE are loaded on the same factor as both tend to measure individual's perception of working together through cooperation and social interaction. This is in contrast with the original scale, where items measuring RLC and SLE were loaded on two different factors and items measuring ISH loaded on the same factor. The item ISH1 had low but acceptable loading of 0.45 and ISH2 having high loading of .94. For a quick comparison between the results of factor loadings of this study and Secchi (2017a), please have a look at the following Table 4.7 and Appendix 3 respectively.

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Table 4.7 Exploratory Factor Analysis of items measuring docility.

Pattern Matrix[a]

		Factors		
		1	2	3
Sociability Learning Environment	DSLE1	.870		
	DSLE2	.836		
	DRLC1	.599		
	DRLC2	.421		
	DRLC3	.314		
	DRLC4	.358		
Socially Distributed Decision-making	DSDDM1		.461	
	DSDDM2		.978	
	DSDDM3		.797	
Role of knowledge	ROK1			.885
	ROK2			.790
	ROK3			.480

a. *Extraction Method: Maximum Likelihood.*
   Rotation Method: Promax with Kaiser Normalization.
b. *Rotation converged in 5 iterations.*
Loadings lower than 0.30 were omitted.
DSLE= *Sociability and learning environment,* DRLC= *Responsibility liability and community,* DSDDM= *Socially distributed decision-making, and* ROK=*Role of knowledge.*

Note: The purpose of EFA was to prepare the variables for a cleaner CFA. Here one dimension with two items (DISH1 and DISH2) needed to be eliminated due to low and cross loadings as well as low reliability.

A CFA was conducted to determine if the "factors of a scale are associated in the manner proposed by the researcher" (Carter 2016: 732). Maximum likelihood estimations with SPSS-AMOS 24 are adopted to analyse data. I kept items measuring SLE and RLC as two separate dimensions following the standard scale. The item DSDDM1 was deleted due to an attempt to attain an acceptable level of goodness of fit (Chi-square (95.050)/DF (degree of freedom) (37) = 2.569, CFI (Comparative Fit Index) = .968, SRMR

(Standardized Root Mean Square Residual) = .028, RMSEA (Root Mean Square Error of Approximation) = .062, PCLOSE (p of Close Fit) = .093). These model fit indexes meet the most referenced cut-off criteria suggested by Hair et al. (2010) and Hu and Bentler (1999). Hence, individual docility can be measured by four factors or sub-constructs; RK, SD_DM, SLE and RLC as seen in the Figure (4.1).

Figure 4. 1 Confirmatory Factor Analysis (Standardized)
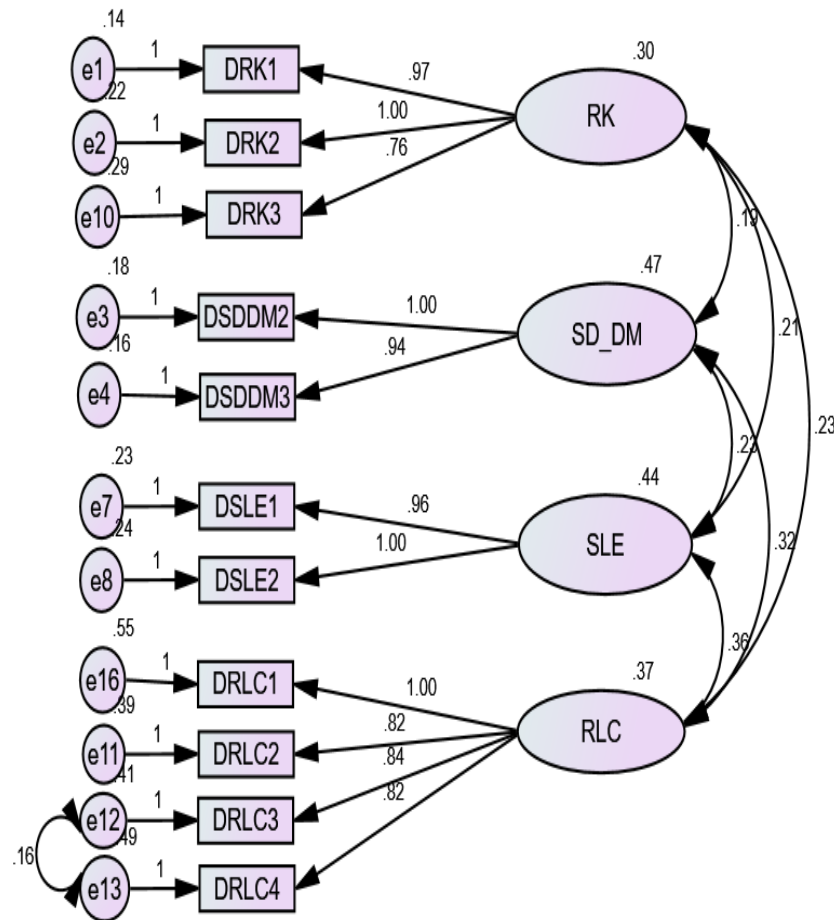
Note: RK = Role of knowledge, SD_DM= Socially distributed decision-making, SLE= Sociability and learning environment, and RLC= Responsibility liability and community.

The reliability of the final construct is measured by composite reliability (CR) and Cronbach's Alpha. Unlike Cronbach's Alpha, the CR considers measurement error (Byrne 2010). The composite reliabilities meet the set standards of CR > .70 (Hair et al. 2010). The CR values for the four factors are (RK = .775, SD_DM = .837, SLE =.783, RLC = .712). The cumulative CR for individual docility is .776.

The final scale of docility at individual level has four sub-constructs comprising of eleven items. The Cronbach's alphas of the scales used in this study and that of Secchi (2017a, written in brackets) were as follows: for RK = .762 (0.570), SD_DM = .835 (0.680), SLE =.783 (0.710), and RLC = .741 (0.715).

The following Table (4.8) shows a summary of reliability and validity of the construct. To evaluate convergent validity, the Average Variance Extracted (AVE) for each sub-construct was evaluated against its correlation with the other sub-construct. Where AVE was larger than the sub-construct's correlation with other sub-constructs, the convergent validity was confirmed (Gefen et al. 2000). Among the sub-constructs, the AVE of RLC is experiencing convergent validity issues as the value is below the suggested threshold of > .50 (Hair et al. 2010). On recommendation of Carter (2016), EFA was examined again to ensure the items did not have any high cross loadings which could cause convergent validity. However, looking at Table (4.6) there are no such cross loadings. The reason can be that the item RLC1 focuses on individual perception about how other individuals including himself collectively take responsibility of their work by understanding organizational goals and objectives. Whereas, RLC2 is about their extent of feeling of responsibility towards the team/division/department. The rest of the two items (RLC3 and RLC4) are measuring individual's perception of their own feelings and attitude in organizational environment. These items capture different motives of individuals which are closely tied to SLE only. Discriminant validity was established

where Maximum Shared Variance (MSV) and the Average Shared Squared Variance (ASV) were both lower than the AVE for all the sub-constructs (MSV< AVE, Hair et al. 2010). Sub-constructs RLC and SLE are facing discriminant validity issues as the values are greater than AVE which does not meet the suggested criteria. However, the maximum reliability (MaxR) shows that each variable is within acceptable standards.

Each sub-construct (or sub-scale) was defined according to what it measures: (1) Role of knowledge [RK] measures employee's beliefs regarding importance of knowledge and multiple opinions when taking advice for decision-making, (2) Socially Distributed Decision-making [SD_DM] measures employee's level of proactive behaviour in social system of organization, aiming to exchange information and help others, (3) Sociability and Learning Environment [SLE] measures employee's perception of organizational social environment comprising of social information resources assisting in learning and motivating behaviours like cooperation, (4) Responsibility Liability and Community [RLC] measures the extent to which employees feel responsible, liable and as an active part of a social community at work.

Table 4.8 Composite Reliability and Factor Correlation Matrix of Docility N = 408

								Correlations			
		CR	AVE	MSV	MaxR (H)	Mean	S.D.	1	2	3	4
1	RK	0.775	0.538	0.479	0.797	4.221	.562	**(.762)**			
2	SD_DM	0.837	0.719	0.584	0.837	3.973	.722	.431**	**(.835)**		
3	SLE	0.783	0.644	0.797	0.783	4.084	.737	.465**	.418**	**(.783)**	
4	RLC	0.712	0.382	0.797	0.713	3.909	.647	.522**	.578**	.643**	**(.741)**

** Correlation is significant at the 0.01 level (2-tailed)
Note: Cronbach alphas are shown in parenthesis in diagonal.
CR= Composite Reliability, AVE= Average Variance Extracted, MSV = Maximum Shared Variance,
MaxR= Maximum Reliability, S.D. = Standard Deviation
RK = Role of knowledge, SD_DM= Socially distributed decision-making, SLE= Sociability and learning environment, and RLC= Responsibility liability and community

4.2.4 Common Method Bias Checks.

To check for Common Method Bias (CMB), first the dataset was evaluated using Harman's single factor test (Harman 1976) which determines if the majority of the covariance can be explained by a single factor. This is a diagnostic technique for evaluating the extent to which common method variance may be a problem (Podsakoff et al. 2003). By constraining items to one factor, only 39.34% of variance was explained. Thus, this shows support that CMB is probably not an issue. Second, a Common Latent Factor (CLF) method using the zero-constrained test was used. This compares the shared variance across items as being significantly different than zero by doing a chi-square difference test between the constrained and unconstrained model. I added a latent factor to the final AMOS CFA model, and then connected it to all observed items in the model. The minimum was achieved in the unconstrained model: Chi-square (22.912), Degree of freedom (26), $p = .638$. Whereas, in the constrained model, all the paths from the CLF were constrained to zero and the minimum was achieved: Chi-square (95.050), Degree of freedom (37), $p = .000$. The difference between both the models was substantially different from zero as $p < .001$ indicating presence of large shared variance. Hence, the CLF was imputed into factor scores. Additionally, Siemsen et al. (2010) have shown that CMB does not affect moderation effects. As most of the hypothesised and non-hypothesised interaction effects were supported, indicating support for the lack of severe biases, since interaction effects cannot be artefacts of CMB (see Siemsen et al. 2010). Hence, the study results hold even under the presence of small CMB.

Lastly, to detect any multicollinearity, the Variance Inflation Factor (VIF) was calculated for the independent variables. Each independent variable was regressed on the others in order to detect VIF. There were no such incidents where the VIF would have gone over 5 indicating multicollinearity issues. In fact, the highest VIF reported was 1.470.

4.2.5 Control variables.

As mentioned in previous chapter, the survey included gender, age, marital status, nationality, level of education, current job tenure, job role, team size, and description of organization in terms of sector. Gender was measured directly (0=male, 1= female). Age was asked for directly, followed by creating categorical indicators (1 = under 25 years, 2 = 26-35 years, 3= 36-45 years, 4= 46-55 years, 5 = 55-65 years, 6 = 66 and older) as it was anticipated that younger workers are more open to experience and social as well as inclined to ask for feedback to reduce uncertainty as compared to older workers (Anseel et al. 2015). Similarly, Knydt et al. (2009) reported that middle aged employees (30 – 39 years) get the most opportunities for feedback and knowledge acquisition from their surroundings. Therefore, I created dummy variable for age, where 1 = respondents older than 36 years old and 0 = otherwise. Job tenure is also controlled for, as it tends to decrease not only the value of feedback for reducing uncertainty, but also face-loss costs may play their role which in turn influence FSB (Anseel et al. 2015; Ashford 1986; Ashford and Cummings 1983; Robertson et al. 2003). This was done by creating a dummy variable (where 0 = less than 3 years, 1 = more than 3 years).

I have also controlled for education, since education might be associated with personality traits and individual's FSB. Therefore, I used dummy variable where 1 = master's degree and 0 = otherwise. Individuals with higher education may be less likely to seek feedback to improve their job performance. I controlled for respondents' job role by using dummy variable where 1 indicated respondent being supervisor and 0 otherwise. FSB or inquiry methods may differ for supervisors due their job responsibilities and their position in the organizations (Ashford and Tsui 1991) as giving feedback to their subordinates is part of their routines tasks and they may indicate higher motivation to seek more for their own progression. Hence, they tend to be more inclined to seek feedback than those with no

supervisory responsibilities. I have also controlled for team size (where 0 = less than and equal to five members, 1 = more than 5 members). Finally, I have controlled for respondent's job sector by creating dummy variables, where 1 indicated respondent being employed in public sector and 0 otherwise. This was done just to see if there were any significant differences in respondent's behaviour when in a different sector.

4.3 Sample Statistics.

The sample size is 408. All respondents were British nationals (100%). Summary of the frequencies of demographics of sample are provided in Table (4.9). The sample comprised of 52.9% female and 47.1% of male respondents. There were 47.3% married, 22.3% single, 21.1% living together, 5.4% divorced, 1.7% separated, 1.7% widowed and .5% did not prefer to tell. Respondents were employed full time (100%) with more than half of them working in private sector (54.7% which is equal to 223 individuals out of 408). Where 40.4% employed in public sector and 4.9% in not-for-profit organization.

Most of the feedback-seeking studies have used newly recruited employees as their sample, however, more than 58% of this sample has more than 6 years of work experience with their current employer. Similarly, 74% respondents are above 36 years of age which ensures stability in sample's personality traits. From the sample, more than 53% of respondents have supervisory responsibilities which may indicate higher motivation to seek more information for their own progression as well as provide feedback as part of their role. More than 80% of the respondents work in teams of more than 5 members. Hence, the respondents were open to wide range of social cognitive sources for seeking feedback as well as explain their docility. However, FSB and docility seem to rely on individual's personality traits. The sample was dominated by graduate and higher degree holders (69%) reflecting upon 80% of the respondents to be in mid ranked, managerial and senior managerial positions.

109

Table 4.9 Frequency table presenting background of respondents   .

N = 408		Frequency	Percentage
Gender			
	Male	192	47.1
	Female	216	52.9
Age			
	Under 25	18	4.4
	26-35	88	21.6
	36-45	110	27.0
	46-55	118	28.9
	55-65	71	17.4
	66 and older	3	0.7
Marital status			
	Single	91	22.3
	Married	193	47.3
	Divorced	22	5.4
	Living together	86	21.1
	Widowed	7	1.7
Education			
	Grammar school	19	4.7
	High school or equivalent	65	15.9
	Vocational/technical school	44	10.8
	Bachelor's degree	134	32.8
	Master's degree	37	9.1
	Doctoral degree	6	1.5
	Some college	81	19.9
	Professional degree	11	2.7
	Other	11	2.7
Tenure			
	Less than 6 months	27	6.62
	between 6 months and up to 1 year	13	3.19
	between 1 and up to 3 years	70	17.16
	between 3 and up to 5 years	61	14.95
	More than 5 years	237	58.09
Job Sector			
	Public sector (e.g. Government hospital)	165	40.4
	Private sector (e.g. Private company)	223	54.7
	Not for Profit (e.g. Charity organization)	20	4.9
Position			
	Entry level	69	16.9
	mid-ranked employee	207	50.7
	Middle Manager	108	26.5
	Senior Manager	24	5.9
Role as supervisor			
	Yes	220	53.9
	No	188	46.1
Team size			
	in teams of 5 members	79	19.4
	in teams larger than 5 members	329	80.6

4.4 Descriptive statistics.

Table (4.10) displays the means, standard deviations, and correlations of the variables. Items' reliability coefficients are provided in diagonal. According to these results, extraversion is strongly and positively correlated with all the feedback-seeking strategies. The highest correlation is with direct feedback from supervisors ($r = .156$, $p < .01$) whereas the lowest is with reflective appraisal ($r = .114$, $p < .05$). Agreeableness is strongly and positively correlated with reflective appraisal from supervisor and co-workers ($r = .155$, $p < .01$) and with direct feedback from co-workers ($r = .112$, $p < .05$). Conscientiousness is not correlated with any of the feedback-seeking strategies. Whereas, neuroticism has a significant and positive correlation with only reflective appraisal from supervisor and co-workers ($r = .098$, $p < .05$). Similarly, OTE strongly and positively correlated with reflective appraisal from supervisor and co-workers ($r = .215$, $p < .01$).

Docility is moderately and positively correlated with all the four feedback-seeking strategies: the highest positive correlation is with direct feedback from supervisor ($r = .213$, $p < .01$) followed by direct feedback from co-worker ($r = .194$, $p < .01$) and then with indirect feedback from supervisor and co-workers ($r = .185$, $p < .01$). Docility has lowest but still significant and positive correlation with reflective appraisal from supervisor and co-workers ($r = .166$, $p < .01$). This analysis provides preliminary support for the claim that docility plays an important role in choice of feedback-seeking strategy and can influence the choices made by employees.

Supervisory role is strongly and positively correlated with indirect feedback from supervisors and co-workers ($r = .115$, $p < .05$), Age above 36 is strongly and negatively correlated with all the feedback-seeking strategies. Team size is strongly and positively correlated with reflective appraisal from supervisor and co-worker ($r = .098$, $p < .05$). Job

tenure, education and private are not significantly correlated with any of the feedback-

seeking strategies.

Table 4.10 Mean, Standard deviations and Correlations (N = 408)

	Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Indirect	2.469	.943	.906														
2	Reflective_Appraisal	3.574	.938	.369**	**.897**													
3	Direct_Supervisor	3.060	.996	.481**	.497**	**.883**												
4	Direct_Coworker	3.197	1.072	.473**	.525**	.611**	**.857**											
5	Extraversion	.0008	.742	.152**	.155**	.156**	.114*	**.848**										
6	Agreeableness	.0001	.565	.017	.155**	.064	.112*	.197**	**.788**									
7	Conscientiousness	.0001	.577	-.065	.091	.002	.023	.278**	.423**	**.832**								
8	Neuroticism	.0003	.645	.054	.098*	.075	.072	-.333**	-.333**	-.313**	**.758**							
9	Openness	.0007	.567	.047	.215**	.105*	.089	.364**	.140**	.173**	-.084	**.782**						
10	Docility	.0004	.407	.185**	.166**	.213**	.194**	.164**	.170**	.253**	-.100*	.215**	**.688**					
11	Job Tenure	.730	.444	.020	-.049	-.069	-.060	-.002	.022	.092	-.085	.005	.075					
12	Education	.110	.311	.041	.046	.001	.010	.013	.047	.075	-.041	-.053	-.073	.104*				
13	Supervisory_role	.540	.500	.115*	-.003	.019	.020	.188**	.030	.103*	-.172**	.192**	.199**	.103*	-.059			
14	Age_above36	.740	.439	-.167**	-.169**	-.162**	-.166**	.008	.117*	.136**	-.228**	.033	.059	.308**	.080	.058		
15	Team_size	.806	.395	-.034	.098*	.044	.050	.030	.087	.066	.014	.075	.010	.010	.010	-.092	-.064	
16	Private	.546	.498	.094	.031	.002	-.027	.064	-.035	.060	.024	.104*	.083	-.087	-.033	-.002	-.046	.002

Note: *p<.05, **p<.01, ***p<.001; N = 408 (two-tailed tests); 1. Job tenure >3 is coded as "1"; <3 is coded as "0". 2. Education (masters and above) is coded as "1"; others are coded as "0". 3. Supervisory_role (if supervisor) is coded as "1"; not a supervisor is coded as "0". 4. Age (>36 years) is coded as "1"; <36 years old is coded as "0". 5.Team_size (>5) is coded as "1"; <5 is coded as "0". 6.Private is coded as "1", others are coded as "0"; *Indirect= Indirect feedback from supervisor and co-worker, Reflective_Appraisal=Reflective Appraisal from supervisor and co-worker, Direct_Supervisor= Direct feedback from supervisor, Direct_Coworker= Direct feedback from co-worker.* Cronbach alpha for the variables are provided in diagonal. The IV are mean centred for moderation analysis.

The section below first tests the hypothesised direct effect of BiG5 personality traits on dimensions of FSB. Secondly, I proceed to moderation analysis of docility. Finally, I discuss the results in detail.

4.5 Findings.

Hypothesis 1a states that extraversion positively affects individual's direct feedback-seeking from supervisor. In the first regression, shown in Table 4.11, model 1, the dependent variable of direct feedback-seeking from supervisor is regressed on extraversion and docility as independent variables. Results indicate that this provides a significant R^2 of .096 (table 4.11, model 1). In addition, results show that high extraversion can positively and significantly predict direct feedback-seeking from supervisor $(\beta=.186; p = .009)$. These findings support hypothesis 1a.

Table 4.11 Regression Model for Extraversion and Direct Feedback-seeking from Supervisor, and Docility as a Moderator

	Direct feedback-seeking from supervisor			
	Model 1		**Model 2**	
Variable	coeff	s.e.	coeff	s.e.
Constant	3.438***	.183	3.459***	.182
Job tenure	-.089	.122	-.095	.114
Education	.100	.166	.104	.190
Supervisor_role	-.066	.107	-.053	.110
Age_above36	-.403**	.123	-.403**	.122
Team_size	.067	.130	.065	.132
Private	-.072	.103	-.085	.104
Docility	.567***	.130	.584***	.131
Extraversion	.186**	.071	.189*	.081
Extraversion x Docility			-.317†	.171
Area of significance[a]			Docility ≤ .0734	
R^2		.096		.105
F		(8)5.287		(9)5.916
		p<.001		p=.0000
Observations		408		408

*Note: *** p <.001, ** p <.01, * p<.05, † p<.10*

Model 2 (Table 4.11) investigates whether the association between extraversion and direct feedback-seeking from supervisor depends on the extent of individual docility. Model 2 shows second regression, in addition to the independent and moderator variable, the cross-product term of the independent variable and the moderator variable (extraversion x docility) is entered as a new variable. This results in an improved R^2 to .105 and the beta coefficients indicate that there is both a significant direct effect of the independent variable of personality i.e. extraversion (β=.1885; p=.0209) and docility (β=.584; p < .001) as well as a moderation effect of docility *(*β=−.317; p= .0649)*.* More specifically, as docility increases by one unit, the effect of extraversion on choice of direct feedback-seeking from supervisor decreases by .317 unit due to a negative coefficient. There is an increase in R^2 from .096 to .105 which is statistically significant. I decided to look for the nature of the moderated effect through probing this interaction by using the methods discussed in previous chapter.

Firstly, the pick-a-point approach identified under which conditions of docility (M) the effect of extraversion (IV) on direct feedback-seeking from supervisor (DV) is significant. The results showed that for 25th percentile (low value of docility) we can significantly predict the relationship between extraversion and direct feedback-seeking from supervisor (β=.2665; p = .002). Similarly, for 50th percentile (moderate value of docility) the effect of extraversion on direct feedback-seeking from supervisor is significant (β=.0586; p = .042). Whereas, for 75th percentile (i.e. high score of docility) the relationship between extraversion and direct feedback-seeking from supervisor is positive but not significant (β=.1053; p =.2860).

Figure 4. 2 Simple slopes: Visual representation of conditional effects of extraversion to choose direct feedback-seeking strategy from supervisor among those relatively low (M=-.25), moderate (M =.06), and relatively high (M=.26) in their level of docility.
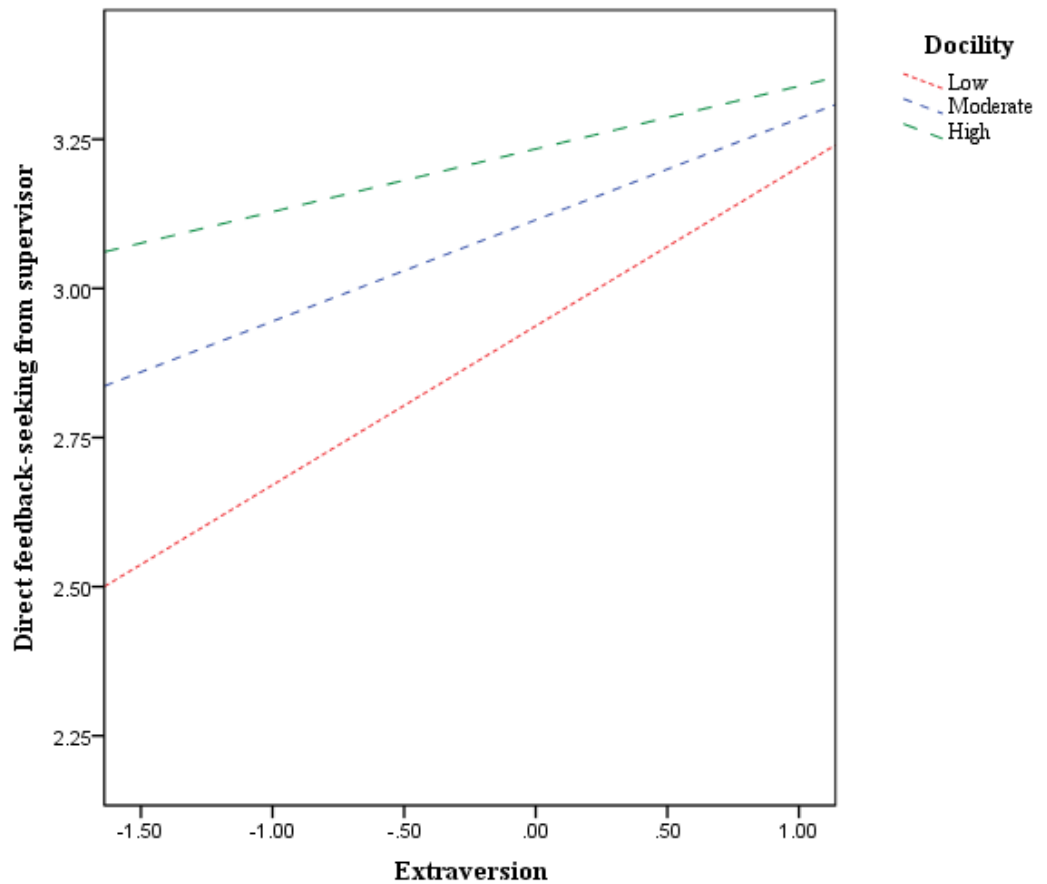
As shown in the Figure 4.2, the extraversion and direct feedback-seeking from supervisor relationship is positive for low, moderate and high docility. Secondly, as discussed in previous chapter, the moderator value defining the Johnson-Neyman significance region shows single value of M (docility) as a point which demarcate the region of significance for the effect of extraversion (IV) on direct feedback-seeking from supervisor (DV): $M1_{JN}$ = .0734 when p = .005. The conditional effect of IV on DV is statistically significant when M is less than .0734 but not greater than this point. The value lies between 50th and 75th percentile in the sample distribution of M. Hence, the region of significance for the effect of extraversion on choice of direct feedback-seeking from supervisor is M ≤ .0734.

The JN technique reveals that when $M \leq M1_{JN}$, the effect of IV on DV is positive and significantly different from zero, meaning that extraverts sought feedback directly from their supervisors. With sufficient support for docility (high docile behaviour) weakening the relation between extraversion and direct feedback-seeking from supervisor, hypothesis 1b is accepted.

Hypothesis 2a states that agreeableness positively affects individual's direct feedback-seeking from supervisor. In the first regression, results indicate R^2 of .082 (Table 4.12, model 1). The results show that agreeableness ($\beta=.081$; p=.388) does not have any influence on direct feedback-seeking from supervisor, this leads to rejecting hypothesis 2a. This is followed by second regression to test hypothesis 2b which states that docility positively moderates the positive relationship between agreeableness and direct feedback-seeking from supervisor. Results show that agreeableness remains non-significant to direct feedback-seeking from supervisor ($\beta=.0728$; p=.48170). Docility ($\beta=.5879$; p=.0000) has a positive and significant association with direct feedback-seeking from supervisor. An analysis on correlations of docility with all four components (strategies) of FSB; correlation with direct feedback from supervisor is highly significant ($r = .213$; p = .000). That means higher docility is associated to the higher preference of direct feedback-seeking from supervisors.

Results depicted in Table 4.12, model 2 do not support hypothesis 2b. That means the individual level of docility does not have a statistically significant effect on the relation between agreeableness and direct feedback- seeking from supervisor ($\beta=.205$; p=.4452).

Table 4.12 Regression Model for Agreeableness and Direct Feedback-seeking from Supervisors, and Docility as a Moderator

	Direct feedback-seeking from supervisor			
	Model 1		Model 2	
Variable	coeff	s.e.	coeff	s.e.
Constant	3.411***	.184	3.404***	.183
Job tenure	-.095	.123	-.096	.118
Education	.109	.168	.111	.195
Supervisor_role	-.019	.106	-.024	.110
Age_above36	-.415**	.125	-.419***	.123
Team_size	.072	.132	.079	.135
Private	-.054	.104	-.054	.105
Docility	.592***	.132	.588***	.135
Agreeableness	.081	.093	.073	.103
Agreeableness x Docility			.205	.267
Area of significance[a]			Not significant	
R-squared	.082		0.084	
F	(8)4.453		(9)4.749	
	p<.001		p=.0000	
Observations	408		408	

*Note: *** p <.001, ** p <.01, * p<.05, † p<.10*
[a] Value of moderator is identified by Johnson-Neyman Technique

Hypothesis 3a states that conscientiousness negatively influences direct feedback-seeking from supervisor. Table 4.13, model 1 indicates a significant R^2 of .081 and shows that conscientiousness negatively but insignificantly ($\beta=-.067$; p=.475) influence direct feedback-seeking from supervisor, this leads to rejecting hypothesis 3a. Model 2 investigates the interactions between docility and conscientiousness indicating higher R^2 of 0.089. Results show that conscientiousness remains non-significant and negative to direct feedback-seeking from supervisor ($\beta=-.0869$ p=.3671).

Docility ($\beta=.6393$; p=.0000) has a positive and significant association with direct feedback-seeking from supervisor. Hypothesis 3b proposed that docility will negatively moderate the negative relationship between conscientiousness and direct feedback-seeking from supervisor. Results show no direct significant relationship; however, the

moderation effect is significant (β=−.3549; p=.0901). The results in Table 4.13, model 2 do not support the hypothesis 3b.

Table 4.13 Regression Model for Conscientiousness and Direct feedback-seeking from supervisors and Docility as a Moderator.

	Direct feedback-seeking from supervisor			
	Model 1		Model 2	
Variable	coeff	s.e.	coeff	s.e.
Constant	3.376***	.186	3.386***	.183
Job tenure	-.096	.123	-.100	.114
Education	.127	.168	.111	.202
Supervisor_role	-.014	.107	-.004	.109
Age_above36	-.393**	.125	-.372**	.123
Team_size	.090	.131	.090	.134
Private	-.054	.104	-.070	.105
Docility	.633***	.134	.639***	.131
Conscientiousness	-.067	.094	-.087	.096
Conscientiousness x Docility			-.355†	.209
Area of significance[a]			Not significant	
R-squared	0.081		.089	
F	(8)4.421		(9)4.837	
	p<.001		p=.0000	
Observations	408		408	

*Note: *** p <.001, ** p <.01, * p<.05, † p<.10*

[a] Value of moderator is identified by Johnson-Neyman Technique

Hypothesis 4a states that neuroticism positively influences reflective appraisal form supervisor and co-workers. The first regression results indicate significant R^2 of .079 (Table 4.14, model 1). The beta coefficients show that neuroticism (β=.117; p=.108) does not have any influence on reflective appraisal from supervisor and co-workers, this leads to rejecting hypothesis 4a. Model 2 investigates the interactions between docility and neuroticism. Results indicate a higher R^2 of .096. Although, neuroticism remains insignificant to reflective appraisal (β=.101; p=.1973). Whereas, docility (β=.419; p=.0009) has a positive and significant association with reflective appraisal from

supervisors and co-workers. It was proposed that docility will negatively moderate the positive relationship between neuroticism and reflective appraisal (hypothesis 4b). The results in Model 2 show that there is a negative and significant moderation effect. However, there is no significant relation to moderate because of insignificant direct relationship between neuroticism and RA. Hence, hypothesis 4b is rejected due to no main effect between IV and DV.

Table 4.14 Regression Model for Neuroticism and Reflective Appraisal from supervisor and co-workers, and Docility as a Moderator.

	Reflective appraisal from supervisor and co-workers			
	Model 1		Model 2	
Variable	coeff	s.e.	coeff	s.e.
Constant	3.657***	.163	3.656***	.161
Job tenure	-.034	.108	-.027	.107
Education	.232	.147	.264†	.152
Supervisor_role	-.007	.094	-.022	.099
Age_above36	-.336**	.111	-.347**	.105
Team_size	.200†	.115	.187†	.113
Private	.014	.091	.028	.092
Docility	.436***	.114	.419***	.125
Neuroticism	.117	.073	.101	.078
Neuroticism x Docility			-.433*	.171
Area of significance[a]			Docility ≤ -.1538	
R-squared	.079		.096	
F	(8)4.257		(9)3.863	
	p=.000		p=.0001	
Observations	408		408	

*Note: *** p <.001, ** p <.01, * p<.05, † p<.10*

[a] Value of moderator is identified by Johnson-Neyman Technique

Hypothesis 5a states that openness positively influences reflective appraisal from supervisors and co-workers. Results of first regression indicate R^2 of .109 (Table 4.15, Model 1). Results show that openness (β = .329, p = .000) has a positive and significant

influence on reflective appraisal from supervisor and co-workers, this leads to accepting hypothesis 5a.

This is followed by second regression investigating hypothesis 5b which states that the positive relationship between OTE and reflective appraisal from supervisor and co-workers is weaken by docility (non-docile behaviour). As shown in Table 4.15, model 2 adds the moderator (openness x docility) as a new variable. This results in an improved R^2 to 0.119 and beta coefficients indicate that openness ($\beta = .3249$, p = .0002) and docility ($\beta = .3327$, p = .0062) remain significantly and positively related to reflective appraisal from supervisors and co-workers. The interaction effect (openness x docility) is negative and significant ($\beta = -.3376$, p = .0586).

Table 4.15 Regression Model for OTE and Reflective appraisal from supervisor and co-workers, and Docility as a Moderator.

Variable	Reflective appraisal from supervisor and co-workers			
	Model 1		Model 2	
	coeff	s.e.	coeff	s.e.
Constant	3.784***	.160	3.815***	.154
Job tenure	-.022	.106	-.027	.105
Education	.240†	.145	.241	.148
Supervisor_role	-.092	.093	-.065	.096
Age_above36	-.387***	.107	-.388***	.106
Team_size	.154	.113	.126	.112
Private	-.016	.090	-.018	.090
Docility	.345**	.114	.333**	.120
OTE	.329***	.082	.325***	.087
OTE x Docility			-.338†	.178
Area of significance[a]			Docility ≤ .3625	
R-squared	.109		.119	
F	(8)4.873		(9)5.351	
	p=.000		p=.0000	
Observations	408		408	

Note: *** p <.001, ** p <.01, * p<.05, † p<.10
[a] Value of moderator is identified by Johnson-Neyman Technique.

Surprisingly, there are significant conditional effects of IV on DV at low to high levels of docility. The conditional effects (as shown in Figure 4.3) of IV on DV at low (25th percentile, $\beta = -.2460$, $p = .0001$), moderate (50th percentile, $\beta = .0586$, $p = .0005$), high (75th percentile, $\beta = .2625$; $p = .0129$) levels of docility are all significant. The conditional effect is insignificant when docility is very high (95th percentile, $\beta = .159$, $p = .173$). The Figure 4.3 shows that OTE and reflective appraisal from supervisor and co-worker relationship is positive for individuals with very low to high docility.

Figure 4. 3. Simple slopes: Visual representation of conditional effects of OTE to choose reflective appraisal from supervisor and co-workers among those relatively low (M=-.246), moderate (M =.058), high (M=.262), and very high (M = .490) in their level of docility.
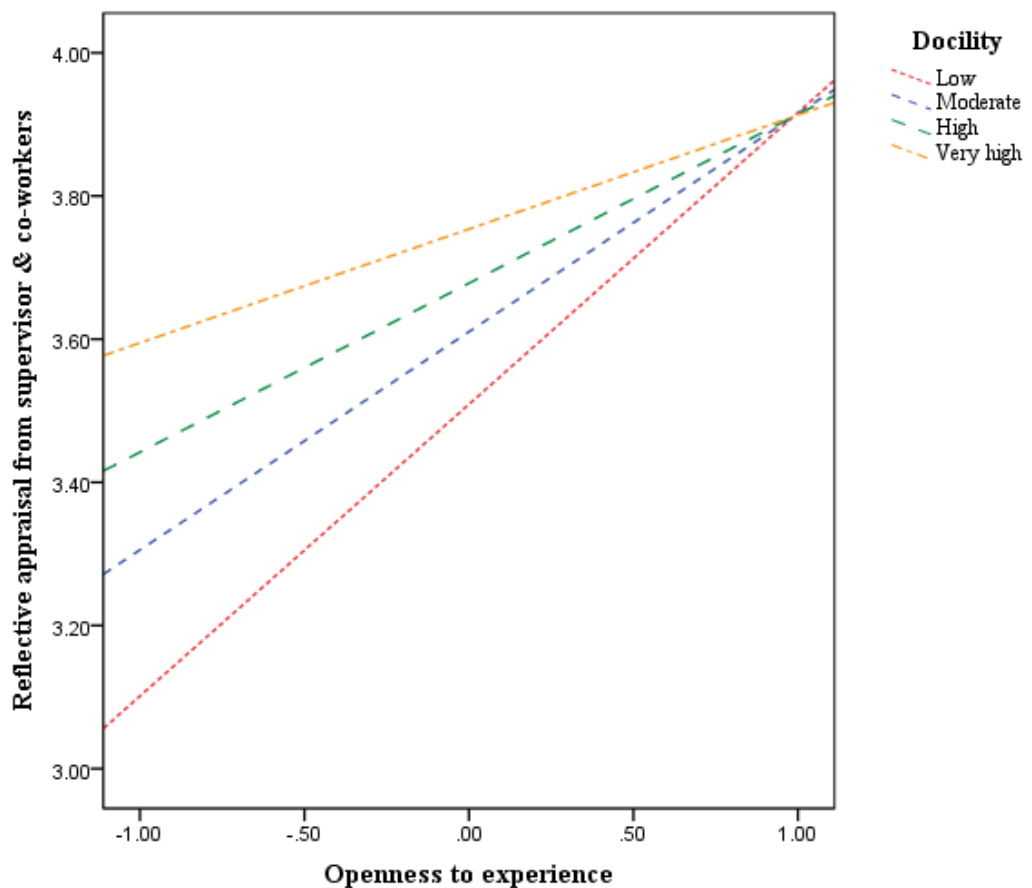
In addition, the Johnson-Neyman Technique showed statistical significance transition point by showing single value of M: Docility ≤ .3625. This shows that the conditional effect of OTE (IV) on reflective appraisal (DV) is statistically significant when M is less than or equal to .3625 and not above this point. Hence, there is evidence that docility (non-docile behaviour) weakens the positive relationship between openness and reflective appraisal from supervisors and co-workers. Hence, hypothesis 5b is supported.

Figure 4.4 displays the simple slopes for the relationship between BiG5 personality traits and all combinations of FSB at low and high levels of docility. The slopes show that high level of docility increases FSB.

Figure 4.4 Regression slopes for Individual Docility
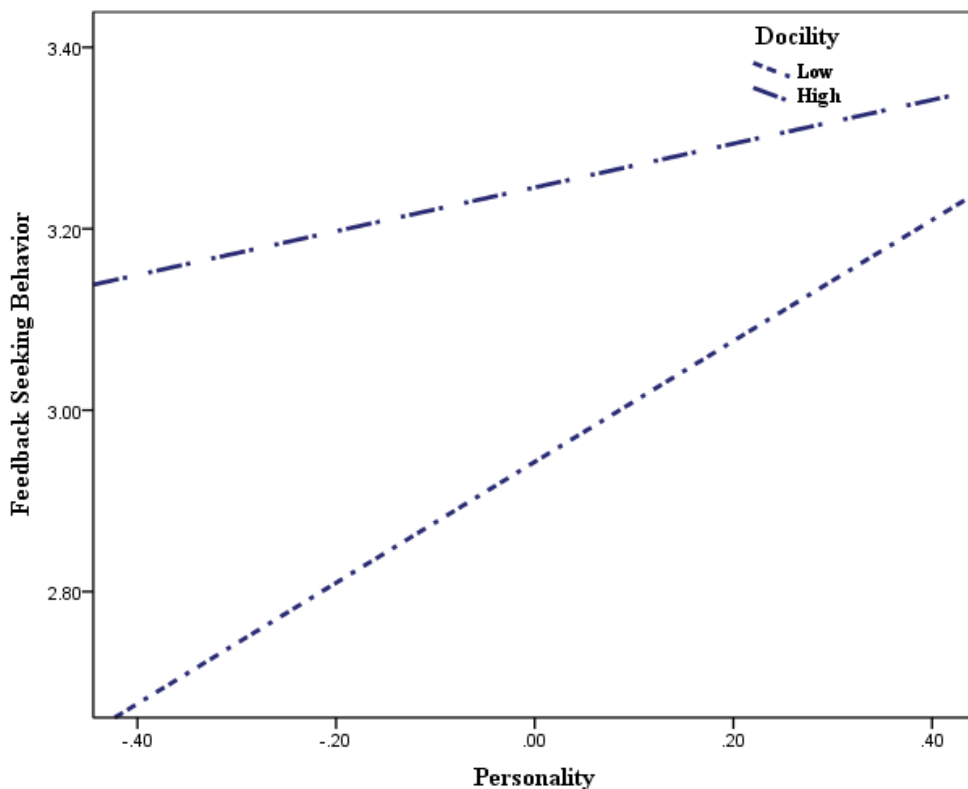
4.6 General discussion on findings.

This study makes three contributions to the literature. Firstly, I have examined the relationship between BiG5 personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism and OTE) and FSB, the analysis showed that individual traits except neuroticism can influence individual's choice of feedback-seeking strategy. The results are promising and possibly encourage more empirical studies to explore other individual and organizational factors which can influence FSB. Secondly, the significant positive relationship found between docility and feedback-seeking strategies has brought a new perspective to the current literature on docility and FSB. Thirdly, the findings enrich literature on docility and FSB. The findings also benefit practitioners by knowing what type of FSB to expect from their staff and how to provide feedback and allocate resources accordingly.

In contrast to Krasman (2010) who studied six combinations of feedback-seeking behaviour in relation to BiG5 domains of personality (Costa and McCrae 1992), I go a step further by introducing docility which plays a crucial role in connecting personality with FSB. This is particularly important as there is a struggle to uncover the antecedents of FSB as well as find the psychological and cognitive factors related to docility. A strength of this research is that it considered the several combinations of FSB separately rather than combining them into one overall measure. This contributes towards knowledge of identifying specific strategies of feedback-seeking influenced by individual personality traits (BiG5) and docility. Studying feedback-seeking strategies separately has allowed greater precision in identifying the choices of inquiry (direct and indirect) and observational (reflective appraisal) methods by different personality traits and docility. Similarly, it has assisted in conceptualizing influence of individual personality on choice of public or private methods of seeking feedback and their preference of

feedback provided by the source (i.e. either implicit or explicit form of information). In addition, it has highlighted the influence of personality traits along with docility on choice of source of information as well as their level of awareness about being sought for feedback. In direct methods, source is aware of them being sought and in indirect and reflective appraisal, the feedback-seeking is concealed from the source. This research contributes towards the literature and identifies how information and sources are approached and what is coming out of it.

In addition, this study is first to measure concept of docility. Docility highlights individual's socially distributed decision-making qualities as well as identifies importance of the role of knowledge when taking advice for decision-making. In addition, docility measures individual's sociability (cooperating with each other to help finish tasks), learning (from each other through exchange of information) and responsibility (discussing goals and objectives) while working within team/department/division in organization. In addition, the factor analysis of FSB scale revealed that direct inquiry, indirect inquiry and reflective appraisal are conceptually distinct from each other and stand on their own as unique strategy (Krasman 2010). Whereas, in contrast to the original scale, indirect feedback-seeking was measured for both supervisors and co-workers with single factor. Similarly, reflective appraisal was measured for supervisor and co-workers as a single factor. In addition, direct feedback-seeking behaviour was measured by two factors, one for supervisor and another for co-workers.

The findings from the analysis did show some statistical support for the hypotheses that docility (positively/negatively) significantly moderates the relationship between personality traits (extraversion, conscientiousness, neuroticism, openness) and feedback-seeking strategies (direct feedback-seeking from supervisors, indirect feedback-seeking from supervisors and co-workers, reflective appraisal from both). Hypotheses related to

125

moderation effect of docility on conscientiousness and direct feedback-seeking from supervisor has been rejected because of no significant direct relationship between IV and DV. Similarly, hypothesis related to the moderation effect of docility on the positive relationship between neuroticism and reflective appraisal was rejected due to insignificant direct relationship between IV and DV. Otherwise, regression analysis showed a significant moderation effect in both cases.

Table (4.16) presents results of the OLS regression analysis ran to test and find the effects of components of docility on components of FSB. It is found that SLE (Sociability and Learning Environment) is significantly and positively related to all sub-factors of FSB. If individual is disposed to learn from others and cooperate when completing their daily tasks, they exchange information which allows them to improve their performance through adopting new ways or enhancing the existing routines. Similarly, RLC (Responsibility Liability and Community) is significantly and positively related to all sub-factors of FSB, strongest with direct feedback from supervisor $(\beta=.252; p=.000)$ and lowest with reflective appraisal from supervisors and co-workers ($\beta=.153; p =.003$). This relationship is also in line with the concepts of docility as i) it encourages individuals to exchange (give and take) information through interacting with social channels, ii) increases feeling of social responsibility when seeking feedback to improve performance, and iii) builds receptivity towards understanding people's concerns and helping to reduce uncertainty.

RK (Role of Knowledge) is significantly and positively related to only direct feedback from supervisor $(\beta=.282; p=.07)$ and reflective appraisal from supervisors and co-workers $(\beta=.326; p=.02)$ and not related to the rest of two strategies (direct feedback from co-worker and indirect from supervisor and co-workers). There are potential reasons of

these relationships. As role of knowledge measures individual's perception about giving importance to knowledge when taking advice, relying on knowledgeable individuals and asking more than one for their opinion when making difficult decisions. Since, supervisors tend to know better than the co-workers due to their experience, RK highly correlates with information coming from supervisors. The finding is consistent with Secchi (2011) and Secchi and Bardone (2009) standing on docility leading to information exchange with more learned and experienced individuals in a social environment. When seeking feedback through RA, one conceals the seeking behaviour from the source of information and waits for the information to be sought privately which is prone to misinterpretation and has risks of increasing uncertainty. Whereas, SD_DM does not relate to any of the components of FSB. Few reasons can explain this finding. Firstly, I looked at both, active and passive sides of docility. The former describes how much individual is dependent on providing information as a social resource to others which assists them in decision-making (inside out perspective of distributed cognition approach DCA). Whereas, the latter is about tendency to rely on information coming from others (outside in perspective of DCA). SD_DM measures the active side of docility where individual acts as a social resource for others; who comforts others, helps to solve problems and assists in decision-making by providing information. Whereas, the sub factors of FSB measure the different ways of seeking rather than providing information.

Table 4.16 Regression Model for sub factors of docility and Feedback-seeking Behaviour (robust standard errors in parentheses).

	Direct feedback-seeking from supervisor	Direct feedback seeking from co-workers	Indirect feedback-seeking from supervisor and co-workers	Reflective appraisal from supervisor and co-workers
	coeff.	coeff.	coeff.	coeff.
RK	.282† (.155)	.189 (.144)	.045(.137)	.326*(.135)
R^2	.008	.004	.000	.014
Adjusted R^2	.006	.002	-.002	.012
F	(1) 3.312	(1)1.712	(1).110	(1)5.804
	p = .070	p = .192	p = .740	p = .016
SD_DM	.102(.129)	.129(.054)	.291*(.112)	.151(.112)
R^2	.002	.003	.016	.004
Adjusted R^2	-.001	.000	.014	.002
F	(1) .624	(1)1.178	(1)6.707	(1)1.799
	p = .430	p=.278	p = .010	p = .181
SLE	.641***(.121)	.515***(.113)	.379***(.108)	.356***(.108)
R^2	.065	.049	.029	.026
Adjusted R^2	.063	.046	.027	.024
F	(1) 28.247	(1)20.827	(1)12.318	(1)10.894
	p = .000	p=.000	p = .000	p = .001
RLC	.252***(.058)	.217***(.054)	.196***(.051)	.153**(.051)
R^2	.045	.039	.035	.022
Adjusted R^2	.043	.036	.033	.019
F	(1)19.185	(1)16.263	(1)14.836	(1)8.985
	p = .000	p=.000	p = .000	p = .003

Note *** p <.001, ** p <.01, * p<.05, † p<.10
Notes: RK = Role of knowledge, SD_DM= Socially distributed decision-making, SLE = Sociability and learning environment, and RLC = Responsibility, liability and community.

As expected, BiG5 personality traits (except neuroticism) were associated with the feedback-seeking preferences after including controls and docility of organizational employees. The following pages show regression tables of each BiG5 personality traits showing their influence on all of the four feedback-seeking strategies followed by moderation. The reason of including these regression tables and discussion is to show the relationships which were not hypothesised in the conceptual model to increase readability and avoid confusion.

Extravert sought feedback using all the four strategies as shown in Table 4.17. As expected and conceptualized their high confidence (Costa et al. 2001) and tendency to seek stimulation through risks (Furnham 2012) positively and significantly influence their direct feedback from supervisors even in the presence of docility (Model 2). The findings related to extraversion support similar findings from Krasman (2010). Their communication with supervisors make them more willing to proactively seek feedback (Barner-Rasmussen 2003) which is why they become open to observational methods as well as verbal. In contrast to previous studies (Tidwell and Sias 2005; Krasman 2010) and my thoughts presented in development of conceptual model, the results showed that extraverts positively affect not only direct methods but also observational situations (e.g. Wanber and Kammerye-Mueller 2000). The findings provide evidence that low level of docility one experiences while seeking feedback plays crucial role in connecting extraversion with FSB. When examining the moderation model, extraversion was weakened by docility in predicting the relationship with direct feedback from supervisor. One explanation could be that low level of docility (non-docile behaviour) restricts individuals to interact and seek feedback from any social channels or to rely on any SOI for completing any cognitive task (Secchi 2011; Simon 1993). Hence, it tends to decrease extraverts desire of direct feedback-seeking from supervisors. In addition, as shown in

Table 4.17, Model 7, extraversion directly influenced reflective appraisal from supervisors and co-workers. When docility was looked at as a moderator as shown in Table 4.17, Model 8 the interaction effect was significantly positive at certain values of docility (moderate and high values of docility only). That means, moderate to high level of docility strengthens the positive relationship between extraversion and reflective appraisal from supervisors and co-workers.

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Table 4. 17 Regression Models for Extraversion and Feedback-seeking Behaviour, and Docility as a Moderator.

	Direct feedback-seeking from supervisor				Direct feedback-seeking from co-workers				Indirect feedback-seeking from supervisor and co-workers				Reflective appraisal from supervisor and co-workers			
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**		**Model 7**		**Model 8**	
Variable	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
Constant	3.438***	.183	3.459***	.182	3.539***	.171	3.5427***	.168	2.623***	.161	2.626***	.158	3.735***	.161	3.730***	.160
Job tenure	-.089	.122	-.095	.114	-.066	.115	-.067	.114	.137	.107	.136	.109	-.024	.108	-.023	.108
Education	.100	.166	.104	.190	.120	.156	.121	.174	.205	.146	.205	.160	.208	.146	.207	.146
Supervisor_role	-.066	.107	-.053	.110	-.037	.100	-.035	.102	.127	.094	.128	.096	-.073	.094	-.075	.100
Age_above36	-.403**	.123	-.403**	.122	-.391**	.115	-.3907***	.115	-.444***	.108	-.444***	.110	-.374**	.108	-.373***	.106
Team_size	.067	.130	.065	.132	.083	.122	.083	.120	-.113	.114	-.114	.112	.183	.114	.184	.116
Private	-.072	.103	-.085	.104	-.118	.097	-.120	.097	.138	.091	.136	.091	.004	.091	.006	.091
Docility	.567***	.130	.584***	.131	.496***	.122	.4987***	.133	.370**	.114	.372***	.110	.384**	.114	.381**	.135
Extraversion	.186**	.071	.189*	.081	.117†	.066	.118	.079	.141*	.062	.142*	.069	.168**	.062	.167*	.071
Extraversion x Docility			-.317†	.171			-.054	.181			-.040	.142			.065	.176
Area of significance[a]			Docility ≤ .0734				Not significant				-.4826 ≤ Docility ≤ .0506				-.1373 ≤ Docility ≤ .5193	
R-squared	.096		.105		.083		.083		.101		.101		.089		.090	
F	(8)5.287		(9)5.916		(8)4.510		(9)4.119		(8) 5.619		(9) 4.996		(8)4.885		(9)4.464	
	p<.001		p=.0000		p<.001		p=.0000		p<.001		p <.0000		P<.001		p=.0000	
Observations	408		408		408		408		408		408		408		408	

Note: *** p <.001, ** p <.01, * p<.05, † p<.10

[a] Value of moderator is identified by Johnson-Neyman Technique.

As shown in Table 4.18, agreeableness has no influence on direct feedback- seeking from supervisor as well as indirect feedback-seeking from supervisor and co-workers. However, agreeableness directly influenced direct feedback-seeking from co-workers (Table 4.18, Model 3) and reflective appraisal from supervisors and co-workers (Table 4.18, Model 7). It is in contrast with previous studies where Krasman (2010) did not find any relationship between agreeableness and FSB. When examining the moderation models, individual's level of docility did not strengthen the relation between agreeableness and direct feedback-seeking. However, there is a conditional effect of agreeableness on reflective appraisal at moderate to very high levels of docility (Table 4.18, Model 8). This could be because of relational characteristic, individual's trust in supervisors and co-workers in terms of cognition (e.g. skill, knowledge, and competence) and affection (e.g., mutual respect and sincere care) as these are likely to influence FSB (Hays and Williams 2011). The higher the trust, the more individual uses the information coming from the social channels (Ossola 2013; Gino and Schweitzer 2008; Sniezek and Van Swol 2001) which can be sought through observational methods.

Table 4.18 Regression Models for Agreeableness and Feedback-seeking Behaviour, and Docility as a Moderator.

	Direct feedback-seeking from supervisor				Direct feedback-seeking from co-workers				Indirect feedback-seeking from supervisor and co-workers				Reflective appraisal from supervisor and co-workers			
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**		**Model 7**		**Model 8**	
Variable	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
Constant	3.411***	.184	3.404***	.183	3.541***	.171	3.532***	.170	2.595***	.162	2.586***	.162	3.738***	.161	3.725***	.158
Job tenure	-.095	.123	-.096	.118	-.064	.114	-.066	.115	.131	.108	.129	.111	-.021	.107	-.023	.110
Education	.109	.168	.111	.195	.115	.156	.118	.172	.215	.147	.219	.158	.200	.146	.205	.145
Supervisor_role	-.019	.106	-.024	.110	-.008	.099	-.014	.104	.163†	.093	.156	.095	-.031	.093	-.040	.098
Age_above36	-.415**	.125	-.419***	.123	-.416***	.116	-.420***	.113	-.446***	.109	-.451***	.111	-.409***	.108	-.416***	.106
Team_size	.072	.132	.079	.135	.071	.122	.079	.122	-.104	.115	-.095	.115	.166	.115	.029	.092
Private	-.054	.104	-.054	.105	-.100	.097	-.100	.097	.150	.091	.149	.091	.029	.091	.029	.092
Docility	.592***	.132	.588***	.135	.484***	.122	.479***	.135	.399**	.116	.394***	.114	.368***	0.12	.361**	.136
Agreeableness	.081	.093	.073	.103	.166†	.087	.156	.098	.019	.082	.008	.085	.236**	.081	.221*	.088
Agreeableness x Docility			.205	.267			.256	.263			.282	.205			.363	.254
Area of significance[a]	Not significant				Not significant				Not significant						Docility ≥ -.0912	
R-squared	.082		.084		.084		.088		.09		.095		.092		.099	
F	(8)4.453		(9)4.749		(8)4.582		(9)4.434		(8)4.917		9(4.566)		(8)5.037		(9)5.325	
	p<.001		p=.0000		p<.001		p=.0000		p<.001		p<.001		P<.001		P=.0000	
Observations	408		408		408		408		408		408		408		408	

Note: *** $p < .001$, ** $p < .01$, * $p < .05$, † $p < .10$

[a] Value of moderator is identified by Johnson-Neyman Technique

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The findings provide evidence that conscientiousness negatively influenced indirect feedback-seeking from supervisor and co-workers (Table 4.19, Model 5). This contrasts with findings from Ashford (1993), Krasman (2010) and Tidwell and Sias (2005); as per their research conscientiousness not only increased direct inquiry methods but also indirect methods (overt methods). According to them conscientious individuals (new comers) have a will to achieve for which they seek information directly and indirectly to ensure high performance. As discussed in the conceptual model, highly conscientious individuals have the urge for order, dutifulness and deliberation (Barrack and Mount 1991). However, they can be very conservative and rule-bound (Murphy 1996) leading to their inability to demonstrate interpersonal adaptability (Pulakos et al. 2000) as well as bringing change in their ways of performing tasks (LePine et al. 2000). Consequently, resulting in avoiding delegations of their cognitive activities and avoiding seeking feedback. When docility was examined as a moderator depicted in Table 4.19, Model 2 the interaction effect was negative and significant (conditionally on indirect feedback from supervisor and co-workers as in Table 4.19, Model 6). This implies that docility weakens the negative relationship between conscientiousness and direct feedback-seeking from supervisor. One explanation could be that docility allows conscientious individuals to rely on accurate information coming from reliable social channels like supervisors who have more knowledge than the co-workers. Hence, high level of docility tends to weaken the negative influence of conscientiousness on direct feedback-seeking from supervisor. Similarly, findings provide evidence that conscientiousness negatively influenced (i.e. decreased the frequency of) indirect feedback-seeking from supervisors and co-workers. The findings are in line with Krasman (2010), where he examined indirect feedback-seeking from supervisor and indirect feedback-seeking from co-workers as separate dimensions. When docility was examined as a moderator, the

interaction effect was not significant albeit with a negative coefficient implying that docility weakens the relation between conscientiousness and indirect feedback-seeking from supervisor and co-workers. Interestingly, conditional effects took place at low to high levels of docility. It could be that docility finds significance in SOI from reliable social channels (Secchi 2011) and any method which involves social interaction; regardless of information received as a reply of direct or indirect enquiry. Hence, high level of docility will encourage conscientious individuals to seek feedback through indirect inquiry methods and utilize SOI as it could help in achieving their goals. Whereas, looking at the low levels of docility weakening the relationship between conscientiousness and indirect feedback-seeking from supervisors and co-workers. It could be that the below average docile behaviour (the selfish one) is focused to increase individual's frequency of seeking feedback to improve their performance only. There is no desire to cooperate and assist others in completing their tasks. The results in Table 4.19 reveal that conscientiousness decreases or negatively influences all inquiry methods of feedback-seeking. Where docility (low and high) is found to weaken these relationships, this supports theoretical characteristics of docility.

Table 4.19 Regression Models for Conscientiousness and Feedback-seeking Behaviour, and Docility as a Moderator.

	Direct feedback-seeking from supervisor				Direct feedback-seeking from co-workers				Indirect feedback-seeking from supervisor and co-workers				Reflective appraisal from supervisor and co-workers			
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
Variable	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
Constant	3.376***	.186	3.386***	.183	3.509***	.173	3.513***	.170	2.535***	.162	2.537***	.158	3.731***	.163	3.7312***	.162
Job tenure	-.096	.123	-.100	.114	-.072	.115	-.073	.113	.137	.107	.136	.108	-.037	.108	-.037	.109
Education	.127	.168	.111	.202	.133	.157	.000	.126	.246†	.147	.243	.157	.206	.148	.206	.148
Supervisor_role	-.014	.107	-.004	.109	-.006	.099	.001	.103	.175†	.093	.179†	.094	-.037	.093	-.038	.097
Age_above36	-.393**	.125	-.372**	.123	-.389**	.116	-.38***	.114	-.417***	.108	-.412***	.110	-.389***	.109	-.389***	.107
Team_size	.090	.131	.090	.134	.094	.122	.094	.120	-.081	.114	-.081	.111	.185	.115	.185	.116
Private	-.054	.104	-.070	.105	-.108	.097	-.114	.097	.160†	.091	.156†	.091	.011	.091	.011	.093
Docility	.633***	.134	.639***	.131	.528***	.125	.530***	.134	.465***	.116	.466***	.110	.388**	.117	.388**	.138
Conscientiousness	-.067	.094	-.087	.096	-.012	.087	-.020	.091	-.185*	.082	-.1898*	.082	.108	.082	.108	.090
Conscientiousness x Docility			-.355†	.209			-.142	.221			-.080	.180			.004	.249
Area of significance[a]	Not significant				Not significant				-.2412≤ Docility ≤.3486				Not significant			
R-squared	.081		.089		.076		.077		.101		.1017		.077		.077	
F	(8)4.421		(9)4.837		(8)4.088		(9)3.507		(8)5.619		(9)5.080		(8)4.140		(9)3.517	
	p<.001		p=.0000		p<.001		p=.0000		P<.001		P=.0000		P=.000		p=.0003	
Observations	408		408		408		408		408		408		408		408	

Note: *** p <.001, ** p <.01, * p<.05, † p<.10

[a] Value of moderator is identified by Johnson-Neyman Technique.

As shown in Table 4.20, Model 7, neuroticism positively and insignificantly influenced reflective appraisal from supervisor and co-workers. The findings are consistent with Krasman (2010) and Tidwell and Sias (2005) as they did not find any significance between the relationships. Interestingly, docility has a positive and significant association with reflective appraisal from supervisors and co-workers. However, when docility was examined as a moderator, the interaction effect was significant and although with a negative coefficient implying that docility weakens the insignificant positive relationship between neuroticism and reflective appraisal from supervisor and co-workers as shown in Table 4.20, Model 8. It could be that the low level of docility (Secchi 2011) combined with individual's high social anxiety will reduce their intention to seek feedback (Levy et al. 1995).

Similar findings are reflected in a limited fashion in the communication literature, Weaver (1998) found those high in neuroticism were frustrated, imperceptive and apprehensive during interpersonal interaction. Hence, they preferred using observational or covert methods of feedback-seeking (Tidwell and Sias, 2005). The conditional effects of neuroticism significantly predicted feedback-seeking through reflective appraisal at very low to low levels of docility. It could be because of the non-docile behaviour restricting individuals to use SOI. They prefer to work alone and isolate themselves from any social environment. They don't cooperate with their colleagues and fail to realize the importance of exchanging information with each other (Secchi and Bardone 2009). In addition, low levels of docility (below average) allow individuals to be open to the influence of the social system they are part of, that is, they do take information from limited sources for their survival but do not provide anything in return. That is, individuals do not make any face to face interaction and prefer to seek feedback privately without letting the source know that they were being sought for feedback. The findings reveal that neuroticism does

not influence inquiry methods of feedback-seeking. Where docility (non-docile and below average) is found to weaken the positive relationship between neuroticism and reflective appraisal from supervisors and co-workers, this supports theoretical characteristics of non-docile attitude towards the social system.

Table 4.20 Regression Models for Neuroticism and Feedback-seeking Behaviour, and Docility as a Moderator.

	Direct feedback-seeking from supervisor				Direct feedback-seeking from co-workers				Indirect feedback-seeking from supervisor and co-workers				Reflective appraisal from supervisor and co-workers			
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
Variable	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
Constant	3.361***	.186	3.361***	.186	3.482***	.173	3.481***	.171	2.567***	.163	2.566***	.162	3.657***	.163	3.656***	.161
Job tenure	-.100	.123	-.098	.115	-.073	.115	-.069	.113	.129	.108	.133	.109	-.034	.108	-.027	.107
Education	.124	.168	.135	.199	.138	.156	.156	.178	.223	.147	.239	.158	.232	.147	.264†	.152
Supervisor_role	.002	.107	-.003	.110	.010	.100	.002	.103	.177†	.094	.170†	.095	-.007	.094	-.022	.099
Age_above36	-.370**	.126	-.374**	.127	-.362**	.118	-.368**	.117	-.420***	.111	-.425***	.115	-.336**	.111	-.347**	.105
Team_size	.085	.131	.081	.133	.095	.122	.087	.120	-.100	.115	-.107	.112	.200†	.115	.187†	.113
Private	-.060	.104	-.056	.105	-.111	.097	-.103	.096	.147	.091	.155†	.091	.014	.091	.028	.092
Docility	.621***	.130	.616***	.132	.532***	0.121	.523***	.131	.411***	.114	.403***	.110	.436***	.114	.419***	.125
Neuroticism	.104	.083	.098	.096	.089	.077	.080	.090	.074	.073	.066	.082	.117	.073	.101	.078
Neuroticism x Docility			-.145	.200			-.250	.206			-.212	.170			-.433*	.171
Area of significance[a]	Not significant				Not significant				Not significant						Docility ≤ -.1538	
R-squared	.084		.085		.079		.084		.092		.096		.079		.096	
F	(8)4.565		(9)4.893		(8)4.266		(9)4.058		(8)5.052		(9)4.660		(8)4.257		(9)3.863	
	p=.000		p=.0000		p=.000		p=.0001		p =.000		p=.0000		p=.000		p=.0001	
Observations	408		408		408		408		408		408		408		408	

Note: *** p <.001, ** p <.01, * p<.05, † p<.10

[a] Value of moderator is identified by Johnson-Neyman Technique

Furthermore, results show that OTE is positively and significantly related to reflective appraisal from supervisors and co-workers (Table 4.21, Model 7). According to Krasman's (2010) results, openness significantly increases individual's reflective appraisal from co-workers, however there is an insignificant positive effect on reflective appraisal from supervisors. The study results show that the inquisitiveness has lead open individuals to seek feedback through more informal and observational methods than formal and direct methods. The results mirror Tidwell and Sias (2005) as their study found a positive relationship between openness and covert methods of seeking performance feedback.

When examining moderation model, there is a negative and significant interaction effect of OTE and docility on reflective appraisal from supervisors and co-workers as shown in Table 4.21, Model 8. Further examination showed significant negative conditional effects of low levels of docility on the positive relationship between openness and reflective appraisal from supervisors and co-workers. This means that when docility is very low, there is a significant influence of openness on reflective appraisal. Low levels of docility (non-docile behaviour) discourages use of any SOI for decision-making or completing cognitive tasks. Hence, it will weaken the positive relationship between OTE and reflective appraisal from supervisors and co-workers. Similarly, high docility relies on active exchange of high quantity and quality of information with skilful and knowledgeable social sources around them (Secchi 2011). By active I mean, exchange of information through social interactions as these add extra value; through facial gestures, body language etc. to the information. Whereas, reflective appraisal consists of passively seeking feedback from social channels through concealed ways. In addition, highly docile prefer to communicate information clearly with others by following standards (Secchi 2011). Whereas, reflective appraisal is observational in nature. Therefore, high docility

tends to weaken the influence of open individuals towards use of reflective appraisal as feedback-seeking strategy because information is passively gathered through monitoring supervisors or co-worker's behaviour as a response to individual's performance.

Table 4.21 Regression Models for OTE and Feedback-seeking Behaviour, and Docility as a Moderator.

	Direct feedback-seeking from supervisor				Direct feedback-seeking from co-workers				Indirect feedback-seeking from supervisor and co-workers				Reflective appraisal from supervisor and co-workers			
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**		**Model 7**		**Model 8**	
Variable	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
Constant	3.432***	.185	3.467***	.183	3.540***	.173	3.579***	.167	2.591***	.163	2.620***	.157	3.784***	.160	3.815***	.154
Job tenure	-.094	.123	-.100	.115	-.069	.115	-.075	.110	.130	.108	.125	.108	-.022	.106	-.027	.105
Education	.123	.167	.125	.199	.136	.156	.138	.174	.217	.147	.218	.158	.240†	.145	.241	.148
Supervisor_role	-.043	.108	-.014	.109	-.027	.100	.007	.103	.163†	.094	.188*	.095	-.092	.093	-.065	.096
Age_above36	-.408**	.124	-.409***	.121	-.395**	.115	-.395***	.113	-.443***	.109	-.444***	.110	-.387***	.107	-.388***	.106
Team_size	.065	.131	.034	.133	.079	.122	.044	.117	-.101	.115	-.127	.111	.154	.113	.126	.112
Private	-.071	.104	-.074	.104	-.119	.097	-.122	.097	.149	.092	.147	.091	-.016	.090	-.018	.090
Docility	.579***	.132	.565***	.129	.499***	.123	.482***	.125	.405**	.116	.392***	.108	.345**	.114	.333**	.120
OTE	.134	.095	.130	.102	.105	.088	.100	.086	-.003	.083	-.007	.086	.329***	.082	.325***	.087
OTE x Docility			-.377†	.198			-.427†	.168			-.316*	.157			-.338†	.178
Area of significance[a]			Docility ≤ -.2126				Docility ≤ -.1817				Not significant				Docility ≤ .3625	
R-squared	.085		.094		.079		.093		.09		.0982		.109		.119	
F	(8)4.964		(9)5.738		(8)4.27		(9)4.927		(8)4.910		(9)4.871		(8)4.873		(9)5.351	
	p=.000		p=.0000		p=.000		p=.0000		p=.000		p=.0000		p=.000		p=.0000	
Observations	408		408		408		408		408		408		408		408	

Note: *** p <.001, ** p <.01, * p<.05, † p<.10

[a] Value of moderator is identified by Johnson-Neyman Technique,

OTE= Openness to Experience

There proved to be much support for what literature suggested amongst key five personality dimensions except for neuroticism as it shows no influence on any of the FSB strategies (Table 4.20). Extraversion has a positive effect on all feedback-seeking strategies (Table 4.17). Agreeableness has positive influence on direct feedback-seeking from co-workers and reflective appraisal from supervisors and co-workers (Table 4.18). Conscientiousness has negative influence on indirect feedback-seeking from supervisors and co-workers (Table 4.19). OTE has a significant positive influence on reflective appraisal from supervisors and co-workers (Table 4.21). The section below is focused on discussing findings from the results.

Few other significant findings in this chapter relate to the effects of age, team size, supervisory role of the respondents and working in a private company. It could be that employees who are younger need more feedback than the ones who are above 36 years of age. That is why, age above 36 has significant negative influence on all the feedback-seeking strategies for all the Big Five traits. This supports findings by Anseel et al. (2015) who found that age negatively influences FSB. Similarly, as individual's experience at job increases, individual become more comfortable with their role and tend to seek feedback less frequently, the study shows that job tenure is negatively related to all the feedback-seeking strategies (except indirect feedback-seeking from supervisors and co-workers) for all the BiG5 personality traits. The findings are close to Anseel et al. (2015) in terms of job tenure negatively influencing FSB. However, the study presents interesting and contrasting results for indirect feedback from supervisors and co-workers being positively influenced by all the BiG5 personality traits. This could be because the more time people spend together as a team within a department or division, the more they get to know each other and prefer to use roundabout questions or jokes to seek feedback about their performance instead of being formal and use direct questions or opt for

observational methods. Team size has no influence on the choice of feedback-seeking strategies except it has a significant positive effect on reflective appraisal when the seeker is neurotic (Table 4.20, Model 7). That is, increase in team size increases neurotic individual's tendency to seek feedback through reflective appraisal. Respondents who had supervisory roles have positive and significant influence of BiG5 personality traits (excluding extraversion) on their indirect feedback-seeking from supervisors and co-workers. Whereas, being a supervisor has a negative influence on seeking feedback through direct or observational methods. This shows that they find the method of roundabout questioning or hinting to seek feedback from supervisors and co-workers as the most appropriate among the rest. The reasons lie in the features of indirect FSB, such as, information is implicit leaving some room for enhancement and is exchanged privately. Literature has identified that supervisors may indicate higher motivation to seek more feedback for their own progression and may choose different methods due to their job role (Ashford and Tsui 1991). Though, research specifically identifying feedback-seeking strategies of supervisors is underrated.

In case of individuals working in private sector, there is a positive and significant influence of conscientiousness (Table 4.19) and neuroticism (Table 4.20), in presence of moderation effect only, on choice of indirect feedback-seeking from supervisor and co-workers. This shows that employees working in private sector prefer to seek feedback mostly through indirect inquiry methods from their supervisors and co-workers.

4.7 Summary.

The purpose of this chapter was to address the first research question i.e., if docility influences the relationship between FSB and individual personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism and OTE)? Specifically, I wanted to understand with empirical analysis when docility influences the choice of individual's

feedback-seeking behaviour within teams. This was done by analysing different personality traits and their relationships with feedback-seeking strategies. This chapter confirms that individual's personality makeup can play an important role in selection of feedback-seeking strategy. The empirical evidence establishes docility as an important moderator of the relationship. When docility of an extravert is high, the choice of direct feedback-seeking from supervisor decreases. Furthermore, when docility of an open individual is low (non-docile behaviour), the choice of reflective appraisal from supervisor and co-worker decreases. The study has found significant moderation effect of docility (non-docile behaviour) and neuroticism on the choice of reflective appraisal from supervisor and co-workers. Similarly, the study has found a significant moderation effect of docility (highly docile behaviour) and conscientiousness on the choice of direct feedback-seeking from supervisors.

The empirical evidence establishes docility as an important moderator in this relationship. The research supports theoretical characteristics of individual's non-docile and highly docile behaviour towards the social system. Chapter 6 provides implications, limitations and ideas for future research along with general discussion on the findings of the chapter. In the following chapter, I will seek to investigate the different organizational characteristics which if changed can influence the pre-conditions of docility to emerge. This will be done through computer-based simulation.

Chapter 5: Defining the role of organizational characteristics on the emergence of docility. [2]

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[2] Parts of this chapter were presented in 8th Annual Graduate School Conference in March 2016 at Bournemouth University and in 3rd Symposium on Agent-Based Models of Organizational Behavior in January 2018 at Huddersfield University.

5.1 Introduction.

The focus of this chapter is to clarify the effect of organizational characteristics— namely organizational structure, costs imposed on seeking and sharing information, and range of interaction—on individual docility. This has been done through agent-based modelling depicting individuals' interactions in an organizational environment, where rules of interactions are defined on the basis of organizational structures (formal or informal). The computer simulation assists in exploring the organizational factors which promote or impede individuals' different types of docility within organizations. The chapter looks at these factors as affecting the main pre-conditions of docility to emerge (i.e. individual being part of a community, following set standards to exchange information, and ensuring public availability of information). Research has not been very responsive in terms of studying influence of organizational characteristics on individual docility. Building on Simon's (1993) work, this chapter expands the model of docility by including new aspects to it. Discussion of findings, contribution to theory, managerial implications, limitations, and suggestions for future research conclude the chapter.

This chapter presents a model of the occurrence of docility within two different organizational structures. I do realize that there is some repetition on describing the concept of docility which have been discussed in chapter 1 and 2. However, I think the repetition could enhance readability and understanding of this chapter.

5.2 Problem statement.

Docility is human tendency to lean on information coming from (Simon 1990, 1993) and to provide information to social channels (Secchi and Bardone 2009) when making decisions. Humans are usually *docile*. Refraining from the common use of the word, I mean that, most of the times, people make decisions using interaction and exchange of information with others (Simon 1993). However, there are occasions when individuals

tend to avoid interacting with their environment and its resources, making them mostly *non-docile* (Simon 1993). The variation in an individual's docility indicates that one's attitude towards a given social environment varies per situation and time (Secchi 2011). Subsequently, it can influence the ways individual performs their cognitive activities specifically decision-making. Therefore, individuals and organizations have much to gain from understanding role of docility during completion of cognitive activities especially decision-making.

The times we seek information originating from social channels around us is unlimited (Bonaccio and Dalal 2006; Harvey and Fischer 1997; Van Swol and Sniezek 2005). The information obtained through social channels potentially fills gaps in knowledge (Belkin et al. 1982), allows making better and timely decisions (Secchi 2011; Simon 1990), assists in learning (McMillan 2016 a, b; Miller and Lin 2010; Secchi 2007), and promotes social responsibility (Secchi 2009). Subsequently, making socially obtained information an effective way for individuals to survive in a system (Secchi and Bardone 2009) and organizations to stay in competition (Davenport and Prusak 1998). In recent years there has been a rise in referencing, if not practicing the concept of 'docility' (Bardone 2011; Miller and Lin 2010; Ossola 2013; Secchi and Bardone 2013, 2017; Secchi 2011; Thomsen 2016; York et al. 2013). As a behavioural and cognitive disposition based on mutual exchange of information, it is fundamental to provide docility with some level of institutionalization (Secchi 2011; Secchi and Bardone 2017). That is, organizations (or social systems) should assist emergence of docility, understand and highlight its value, and support docile individuals (Secchi 2016). This is only possible if we know various organizational elements which may promote, stabilize or impede the occurrence of individual docility within organizations. This exploratory work uses agent-based model (ABM) to evaluate whether some theoretical assumptions hold and to assess under what

conditions they do hold to facilitate docility within organizations. In short, ABM is developed to find whether organizational structure (formal and informal), costs imposed by organization when seeking and sharing information, and limiting number of social interactions make any difference in the emergence of docility. It is important for organizations to know the factors which can obstruct or slow down flow of information causing major problems.

First, the chapter investigates the emergence of docility with newly defined attributes under two different organizational environments: one follows formal rules of hierarchy and another follows informal rules of hierarchy where everyone is free to interact with everyone else. Research (e.g. Secchi and Bardone 2013, 2017) has approached docility as a behavioural and cognitive disposition which can assist in analysing social interactions and their effects within organizations. However, extant research has overlooked describing the influence of rigid rules of interaction (as applied in formal structures) on its emergence within organizations. Second, the study looks at the effect of costs imposed on seeking and sharing information which can influence emergence of docility, consequently disturbing flow of information. Third, it looks at the influence of imposing restrictions on number of social interactions on the emergence of docility, resulting in restricting flow of information. Fourth, the research presents and studies different types of individual docility in relation to differences in their need for information-seeking and the quality of information they share with others in their surroundings. Finally, the use of ABM has offered advancements in the concept by allowing to experiment large range of parameters and value variations pertaining to organizational factors.

The simulation replicates the model of the organizational environment where employees (agents in simulation) exchange information, with each other for making decisions, depending on their type of docility. In addition, it shows how agents in the simulation are

influenced by the docile behaviour of agents in their surroundings. The research presented in this chapter has two primary objectives. First, the chapter explores the effect of organizational characteristics on the emergence of docility. This is done using an ABM that uncovers the influence of formal rules of interaction based on employees' hierarchical status on the occurrence of docility. The main interest of the research is to observe the emergence of docility in two different organizational structures under different conditions of costs imposed and range of interactions. The second objective of this chapter is to conceptualize types of individual docility based on different attributes and contribute to building of a theory of docility (Simon 1993; Secchi 2011). Consequently, the chapter aims to explore and answer new questions on conditions which affect docility within organizations.

5.3 Docility in the new era.

Studying human 'docility' appears to be appropriate today as opposed to the time when it was introduced (Simon 1990, 1993) due to the technological advancements allowing individuals to interact to seek information when and where needed. The prevailing three decades have seen an upsurge in the ease of access to electronic resources comprising of information from other people. The information can be exchanged through computer mediated communication (CMC) systems or face to face (f2f) live human interaction. More than two decades ago when Simon presented the idea of docility, he referred to the latter form of human interaction. With the advancement in technology the f2f communication has been mainly substituted by the CMC, where individuals interact socially through a virtual interface. It is very important to note that in almost any information-seeking context there is a strong preference for information that originates directly from other people (Case 2012; Krikelas 1983; Secchi 2011; Simon 1990, 1993). Use of other channels tends to be predicted by the social presence they offer, that is, how

much they are perceived as being like a f2f exchange of information with another person, or as Johnson puts it "the extent to which they reveal the presence of other human interactants and can capture the human, feeling side of relationships" (Johnson 1997:92). Krikelas's (1983) observation that individuals get information from the most convenient place first (e.g., Other people) still applies now. Within an organizational setting, if one knows that someone has the solution to their problem, inevitably initiates ways to contact that person (Garicano 2000). This happens because the information seeker considers the other person as an external social cognitive resource who has the knowledge or the access to the required source. When individuals interact in a social environment (organization) they are open to be influenced by the resources in it. That is, their cognitive processes can be influenced by the information exchanged between them. Not only this, the social interaction has the potential to influence their adaptability to the environment. This phenomenon is termed as *'docility effect'* and is created through interactions in a social system; interactions devoted for information exchange. Research acknowledges use of other individuals for information-seeking (e.g. Anderson et al. 2008; Borgatti and Cross 2003; Camhy and Ruble 1994; Hertzum and Pejtersen 2000; Yitzhaki and Hammershlag 2004). Research has also shown use of colleagues and experts' advice as mostly utilized information source in medical professional groups (Hider et al. 2009; O'Leary and Mhaolrúnaigh 2012). Indeed, we acquire our basic understanding of the external world – and even awareness of ourselves–from information provided by others (e.g. Sedikides and Gregg 2003).

Furthermore, a large literature in the field of social psychology suggests that other persons are every so often a very significant source of information (e.g., Baron et al. 2005). Individuals must decide not just whether to seek a particular type of information, but also how to get that information (Morrison and Bies 1991) which can decrease uncertainty

and increase their knowledge (Ashford and Tsui 1991; Morrison 1993). Depending on the nature of organization, employees are exposed to the use of intranet (outlook express for emails), internet, social (Facebook) and professional networking websites (LinkedIn), instant messaging services (WhatsApp, Viber, Hangout) and multi-media telephone or video conferencing (e.g. Skype) for exchange of information. The concept of docility has progressed from making decisions by using information obtained through live human f2f interaction to completing cognitive tasks by exchanging information through computer based social interactions. These social interactions are channelled by different ways of communication within or outside a social system. This puts an emphasis on the fact that individual decision-making is open to the influence of socially distributed information and is a socially based process where the technological tools are boosters of docility. Organizations which use CMC tools for communication are facilitating individuals to be more docile (Secchi 2011). However, use of information gathering tools (i.e. information technology) for decision-making depends on their attitude towards the social system (Zack and McKenney 1995; Xu et al. 2010). To be precise, use of information technology for seeking information from social channels is defined by individual docility. This highlights the importance of studying docility within contemporary organizational environments.

5.3.1 Docility facilitates adaptation through feedback-seeking.

As mentioned above, when docile seeker interacts with the social environment they are open to the influence of others and tend to imitate and follow more successful decision strategies (Secchi 2016) for their survival in the social system they are part of. The strategies may include the specification of methods which result in better decisions, better solutions of problems such as the "search and use of information from social channels" (Secchi 2016:4). These activities — interacting, influencing or being influenced,

imitating, following, searching, and using — fall within the general behavioural category of adaptation. According to American College Dictionary, to adapt is "to adjust fittingly" (Barnhart and Stein 1966). Within organizations, individuals adapt by adjusting their behaviours to fit the demands of a specific environment. The adjusting is based on information they receive or obtain about that environment. Therefore, securing adequate information about the environment is a central consideration in successful adaptation (White 1974). This chapter looks narrowly on one task of adaptation through the concept of docility, i.e. securing adequate information. When one adapts to the environment, they are actually modifying the way their cognition works and changing their attitude towards the social system which eventually influence the ways in which one 'seeks and shares information'. The chapter looks at the behaviour of 'seeking and sharing adequate information' through the lens of individual docility.

Generally, docile individuals start seeking information sources after identifying a 'need' which indicates a state that arises within a person, suggesting some kind of gap in knowledge (Case 2012; Zerbinos 1990) that requires filling and this "gap can be filled by something that the needing person calls 'information'" (Dervin 1983:156). A specific type of information that would seem to be particularly important in the process of adaptation is that pertaining to the appropriateness of behaviour for achieving various goals. This information is usually called feedback (Ashford and Cummings 1983; Ilgen et al. 1979). Feedback has particularly high instrumental value under uncertain situations and that is when people seek more feedback. For example, newcomers within organization need to 'learn the ropes' and information from feedback is specifically valuable to foster their adaptation (Ashford 1986; Ashford and Cummings 1985; Miller and Jablin 1991; Morrison 1993). The information gained from feedback decreases uncertainty regarding both one's job roles and the performance contingencies in the

organizational environment. As they become more adapted, the frequency of feedback-seeking decreases (Ashford and Cummings 1985; Callister et al. 1999). Where this study claims that the extent to which one has higher or lower levels of docility seem to be attributed to their 'need for information-seeking', eventually influencing their adaptation. Hence, need for information-seeking from social channels (henceforth, *nfIS*) becomes an attribute defining individual's level of docility. Similarly, the "quality of information shared" (Secchi and Bardone 2009:9) among the like-minded people specifies that the information they share is relative and effective for the seeker to adjust in the system.

Generally, the more the quality, that is the high relevance of information enhances individual's ability to process received information consequently increasing the effectiveness of decisions (Keller and Staelin 1987) allowing the individual to fit in the social context. Together with the quality of information (henceforth, *qoI*), the extent to which individual has a need to seek information from social channel (*nfIS*) describe the difference between more or less docile individuals. Individual might present docility "below, on or above the average of the other docile individuals in the population" (Secchi and Bardone 2009:340). Docility recognizes a class of individuals — the docile individuals — who are characterized by reliance on the SOI along with a general inclination to share information with people who need help in completion of their cognitive tasks resulting in collaboration (Secchi and Bardone 2009; Simon 1993; Knudsen 2003). Literature has further divided docile individuals into two categories, people who are only ordinarily docile (average docile) from those who are highly docile (above average docile) (Secchi 2011; Secchi and Bardone 2009). Whereas, the people who do not use significant amount of information (i.e. suggestions, comments, advice, and recommendations) from other people to carry out any cognitive activity are non-docile. Once described this way, individuals are defined with respect to their docility

having different *nfIS* and different *qoI shared* through social channels for making decision. Individuals who are more inclined towards taking information from others are passively docile and it can be said that they use passive side of docility. Whereas, those who tend to provide information and/or enhance information are actively docile, hence use active side of docility. Individuals who just care about their survival, are fully self-interested, and do not consider helping other members in the system are not docile and are selfish (Secchi 2007). They do not adapt to the social system whereas the docile individuals do which increases their probability to survive in the social system. Regardless of the environmental factors, non-docile just bound their thoughts to themselves in a predefined set of preferences. Through the concept of docility Simon (1990,1993) presented the social side of BR by speculating that individuals behave altruistically in contemporary human societies resulting in a docile environment where the survival of the unfit i.e. selfish (non-docile) diminishes with the passage of time. Types of docility are defined in detail as part of the model development as they represent agents in the simulation model.

5.3.2 Costs associated with docility.

Docility relates to a prosocial behaviour and is traditionally linked to altruism (Knudsen 2003; Secchi and Bardone 2009; Simon 1992). As docile individuals frequently engage in exchanging information implying altruism which costs them while benefiting others (Khalil 2004; Knudsen 2003). I look at cost from individual as well as organizational perspective. At individual level if we talk about ***passively docile*** the cost will be spending time and effort in looking for social channels and gathering information from them. Using cognitive abilities to understand, evaluate and use that information. It is also about face value, letting people know what you don't know. For ***actively docile,*** costs are higher because they spend more time and effort in looking for knowledgeable social channels

for gathering high quality of information, using efficient and effective ways of communicating information which will incur costs, and putting more efforts and skills in manipulating information and creating new information. In addition, leaving own work to help others can be considered as causing cost. For actively docile the face value can be considered as costing them in terms of letting people know what one knows. The frequency of interaction with others will increase leaving less time for *actively docile* to complete their own work.

Costs imposed by organization can be actions taken by the organization which restrict social interaction and act as barrier to flow of information. For example, employees are restricted to exchange information because of insecure chat line, employees are not allowed to seek feedback from managers apart from scheduled meetings. In addition, restricting access to knowledgeable resources, e.g. highly skilled can be accessed during trainings only. Similarly, situations in which organization does not appreciate cooperative behaviour, discourages prosocial behaviour and information seeking and sharing, and lacks provision of a supporting environment. All these situations can be considered as examples of costs imposed by organization. Passively docile pays cost of seeking only whereas the actively docile pays cost of seeking as well as sharing. Individual cost of seeking is proportional to how often individual seeks it (i.e. cost of seeking rate *csrate*), whereas the cost of sharing is proportional to how often one shares information with others in the system (i.e. cost of sharing rate *cshr*). Individual cost of seeking information (*csi*) and cost of sharing information (*cshi*) are calculated through following equations 1 and 2 respectively. Concisely, it will cost more the less one seeks information in a social system. Similarly, the more frequent one shares high *qoI*, the higher will be the '*cshi*'.

$$csi = \frac{\ln(nfIS)}{csrate} \quad (1)$$

$$cshi = \frac{\ln(qoI)}{cshr} \quad (2)$$

Where,

csi	stands for cost of seeking information
ln(nfIS)	log (need for information-seeking) [3]
csrate	cost of seeking rate
cshi	stands for cost of sharing information
ln (qoI)	log (quality of information shared) [4]
cshr	cost of sharing rate

These costs have an influence on individual's fitness, i.e. the more docile tends to pay higher cost of seeking and sharing resulting in decrease in their fitness. In order to survive, they adapt to the environment and mimic those behaviours (e.g. less docile) which are favourable and have highest fitness in their surroundings. This research has adapted Simon's selection theory to consider human interactions in order to examine which type of individual docility has more chances of increasing individual fitness in social environment either it be an organization on the whole, a department or a team. Instead of equation-model as used by Simon (1990, 1993), I have used ABM which allows to examine which type of individual has more chances of looking at what happens to docility when the rules of interaction are imposed. Before I present the model, I would like to provide a summary of the reasons of choosing ABM for studying the phenomenon of docility. The details were provided earlier in Chapter 3 (section 3.6).

5.4 Use of Agent Based Modelling (ABM).

As previously discussed in the methodology chapter, there is a growing interest in using ABM in studying organizational behaviour (Secchi and Neumann 2016) due to its

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[3] and [4] The logarithm of *nfIS* and *qoI* denoted as ln(*nfIS*) and ln(*qoI*) allows any positive real number from the values assigned to different types of agents as in Table (5.6) to be raised to any real power, always producing a positive unique real number.

suitability to model complex adaptive social systems as well as model socially distributed cognitive activities, such as decision-making (Secchi 2016). ABM offers a way to model social systems e.g., organizations, that comprise of agents who interact with and influence each other and adapt their behaviour so they are better fit to their environment (Macal and North 2010). ABM has allowed to replicate the model of the real phenomenon of docility by creating a computational environment of organization where agents (employees) have different docile behaviours, described through different attributes (e.g. *nfIS* and *qoI*). ABM has allowed to model agents who are heterogeneous in their features and interact by following set rules, which in turn influence their behaviour (Macal and North 2010).

During interactions agents exchange informational messages which become source of learning for them; assisting them in acting. These messages can carry information about interacting agent's characteristics or information unveiling the effects of other agent's actions. In the model, agents interact with other agents while passing information about their fitness as well as observing another agents' fitness in their surrounding and adapt to the favourable and fittest attitude. This depicts individual's openness to be influenced by the social system and is modelled through concept of docility. Interaction is particularly relevant for the study of individual docility as it is the way individuals exchange information and show their willingness to be influenced by the social resources in a given environment (Secchi 2011).

ABM has proven to be more flexible and adaptable than mathematical or differential equations as it offers the possibility of simulating individual heterogeneity (Gilbert and Terna 2000; Gilbert 2008). It has allowed to observe the outcome of interactions within organization which is very complex to observe in reality. Studying interactions and their outcome can provide us the understanding of which type of individual has more chances

of increasing their fitness in organizational environment. From the literature and assumptions, it is straightforward that highly docile will fit in the environment better than any other type of individuals. The research focuses on process of interaction between heterogeneous agents creating docility effect which influence others in the system. By modelling the effects of docility on individual varying *nfIS* from other individuals and *qoI* shared in the social system under two different scenarios, an understanding of how and why docility appears or diminishes can be gained.

In addition, the flexibility of ABM to study docility is the fact that this tool has already been used to study the concept of docility. Secchi (2016) has used it to find the conditions under which organizational docility is supported. All the features of ABM brought the study closer to what I wanted to understand. To study the impact of organizational factors on individuals with different levels of docility a simple simulation model coded in Java-based Netlogo language was developed. Netlogo is a very popular agent-based simulation environment (Wilensky 1999). The modelling language is "Netlogo" and is easy to learn and understand. Its interface is user-friendly and allows using built-in features including switches, slider, and graphs as required. Netlogo is a multi-agent programmable modelling tool developed by The Center for Connected Learning and Computer-Based Modelling at Northwestern University in Evanston. IL (Wilensky 1999). The ABM comprised of the features important to study this phenomenon as intentional simplification is strongly recommended in modelling approaches (e.g., Gilbert 2008). It means that the model focused on characteristics of heterogeneous agents appearing in the space (organization) at random and interacting with each other according to the defined rules while it is agnostic about other features of the agents. The code of ABM programmed in Netlogo is attached as Appendix 4.

5.5 Components of the Model.

I have borrowed the original model of docility from Simon (1993), where he used equation-based simulation, as a starting point for developing my computer-based simulation. I have expanded Simon's (1990, 1993) hypotheses on altruism and selfishness grounded on the concept of docility as well as Secchi and Bardone's (2009) notion of different levels of docility grounded on the concept of distributed cognition. Following Secchi (2016) and Secchi and Bardone (2009) I have expanded the model by introducing different types of docility and applied it to individuals within a formal social system of organization.

5.5.1 Space and types of agents.

Space is the two dimensional (x and y coordinates) limited area where agents reside, move and interact with each other (Gilbert and Terna 2000) and mimics social system of an organization. The space acts as a channel of communication between agents which when required also buffers the information exchanged between agents (Gilbert 2008).

Depending on the extent to which agents' docility, have certain level of *nfIS* and *qoI*, is willing to pay cost of seeking and cost of sharing information imposed by the organization, there are four types of agents: (i) non-docile (*nd*) (ii) below average docile (*bd*), (iii) average docile (*ad*), (iv) above average docile or highly docile (*hd*). These types of docility are described in detail below.

5.5.1.1 Non-docile (nd).

The non-docile represents individuals who are deskbound especially when they are surrounded by other individuals. They tend to avoid any social contact and participation in organizational activities. Due to limited social interactions, they fail to know people who can be valuable cognitive resources for them. They carry out their cognitive activities independently and do not utilize any SOI. The reason being their inability to realize the

importance of using information coming from social resources, due to their incapability they look a lot like "social fools" as described by Etzioni (1988). They are surrounded by very limited inanimate personal resources which they use to make their decisions. Due to no social network within the organization these individuals are the ones who face redundancy as they don't have anyone to refer them to another internal opportunity. They are also the ones who while working in one organization keep on looking for another job somewhere else (Secchi and Bardone 2009).

They prefer to work alone and isolate themselves from any social environment; resulting in lowest to null *nfIS* from others. They do not cooperate with their colleagues in terms of exchanging information as they are incapable to understand the value in sharing information with others (Secchi and Bardone 2009). The quality of information non-docile has is assumed to be lowest to null due to no input from social channels (SC), consequently affecting the quality of outcome of task. In organizations, these individuals are the ones who are unsatisfied by the company and uncomfortable with the people around them. As they are not docile, they cannot be altruist towards the social system (Secchi 2007) hence, they do not provide suggestions, comments, information or advice to anyone in the social system. This result in lowest to null *qoI* shared. They do not enhance the information or the SC.

The values of *nfIS* and *qoI* are attributed through random float distribution with a value of 0.1 which gives a number at least 0 but strictly less than 0.1. They do bear cost of seeking information, however cost of sharing tends to be null as they don't share information. The attributes of *nd* are summarized in Table (5.1).

Table 5.1 The characteristics of a non-docile individual.

	Passive Side of Docility				Active Side of Docility					
	Depend on SOI	Use of SOI	Quantity of SOI	Quality of info required	Enhance SOI	Create info	Quality of info created	Provide info	Quantity of info shared	Enhance SC
Non-docile	*No*	*No*	*Null*	*Lowest to Null*	*No*	*No*	*Lowest to null*	*No*	*Lowest to null*	*No*

5.5.1.2 Below-average docile (bd).

The active attitude of docility allows individuals to provide information which they want to share with others, what about those who don't want to share information with others but still want to distribute their cognitive functions in the social system for their own use only? We have people around us who depend on information coming from others and in return they do not provide any information. They are docile yet selfish. Although docility implies altruism (Secchi 2009) then who are these people?

The significance of altruism is confirmed in everyday life by psychological studies of helping behaviour (Monroe 1994; Piliavin and Charng 1990). However, if we look around we will find combination of altruistic and selfish people depending on each other for information-seeking. The completely selfish are the non-docile who do not give or take information from social channels, but there are individuals who are not completely selfish in a sense that they do take but do not provide information to others. Therefore, it is not possible to have a complete altruistic environment in a docile system, as "even in the social system dominated by altruism, the selfish do not disappear, even if they cover a very limited role in the game" (Secchi 2007: 16). Research presents an individual with different degree of docility which uses docility in its passive side by receiving information from others and active side for externalizing their thoughts and ideas for their personal use only. These are called below-average docile.

The below-average docile (henceforth, *bd*) individuals make decisions by simply leaning on the information received from the social channels on occasional basis from a selection of resources (e.g. particular website, specific person). They do not acquire nor utilize huge amount of information for their cognitive tasks. Hence, their *nfIS* is quite low. These individuals use passive docility at the minimum level i.e. they utilize the information coming from others without giving priority to the quality of information they are receiving. They are unable to compare between information resources on the basis of its relevancy with their information need, hence end up with extra irrelevant information causing information overload. The attributes of *bd* are summarized in Table (5.2).

Table 5.2 The characteristics of a below average docile individual.

	Passive Side of Docility				Active Side of Docility					
	Depend on SOI	Use of SOI	Quantity of SOI	Quality of info required	Enhance SOI	Create info	Quality of info created	Provide info	Quantity of info shared	Enhance SC
Below Average Docile	*Yes*	*Minimum*	*Minimum*	*Low*	*No*	*Yes*	*Low*	*No*	*Null*	*No*

The *bd* individuals prefer to restrict access to their information resources by avoiding interacting with information seekers. Hence, whatever is produced by them intends to be a non-social resource with a low *qoI*. They just take information from others and are not comfortable in providing suggestions, comments and information to others. They are selfish and prefer to free ride. They use any SOI to make a decision without any distinction between the social resources. They are focused to complete the task with or without following the routines. These are the individuals who have very few people in their social network, again because of their selfish attitude.

The *nfIS* is attributed through random normal distribution with a mean value of 0.25 and standard deviation of 0.05. The *qoI* is attributed through random float distribution with a value of 0.1 which gives a number at least 0 but strictly less than .1 to show that *bd* do

not share information. They tend to avoid paying cost of sharing information, whereas they do bear cost of seeking information which is lower than what the *nd* pays.

5.5.1.3 Average-docile (ad).

Average-docile individuals use information coming from social channels particularly other human beings in their social system as a major basis of their choice (Secchi and Bardone 2009). Making decisions on the basis of information exchanged with others at work is their main cognitive and behavioural ability. They tend to follow regular patterns and routines of information exchange. The passive side of docility allows average docile (henceforth, *ad*) to take information from social channels and utilize the same information without any modifications (Secchi 2011). For them any socially available information is useful for their decision-making. This shows that *ad* do not utilize their cognitive abilities to enhance the information or the social channel. They use low quality of information (i.e. information which is not relevant and effective) as they are unable to identify the significance of the sources based on their abilities.

The active side of docility allows *ad* replicating the received information to provide it to others. The active side of docility is slightly weak in *ad* individuals as they are unable to create or even modify the information. They do not like change and prefer to follow organizational routines which may increase their intelligence but not instigate creativity through enhanced cognitive functions (Secchi and Bardone 2009). It can be assumed that for the same reasons their decisions lack creativity or an input from their end, nevertheless they are persuasive than the less docile as show willingness to exchange information with others. The attributes of a*d* are summarized in Table (5.3).

Table 5.3 The characteristics of an average docile individual.

		Passive Side of Docility			Active Side of Docility					
	Depend on SOI	Use of SOI	Quantity of SOI	Quality of info required	Enhance SOI	Create info	Quality of info created	Provide info	Quantity of info shared	Enhance SC
Average docile	*Yes*	*Yes*	*Adequate*	*Moderate*	*No*	*Yes*	*Moderate*	*Yes*	*Moderate*	*No*

The amount of information received by *ad* individuals is comparatively greater than the information produced. The reason lies in their loyalty and dependence on established routines and association with the social channels. Hence, they use the passive side of docility most of the time and discount developing new routines or new social information resources frequently for enhancing their or others decision-making process. They are not inclined towards enhancing the SOI as for them the chosen social channel had the best information.

The *nfIS* is attributed through random normal distribution with a mean value of 0.5 and standard deviation of 0.05. The *qoI* is attributed through random normal distribution with a mean value of 0.5 and standard deviation of 0.10. They pay cost of seeking and sharing information which are lower than the previous categories.

5.5.1.4 Highly docile.

Highly docile are the ones who show the highest level of docility by utilizing both the passive and active sides of docility at their best (Secchi 2011; Secchi and Bardone 2009). Highly docile (henceforth, *hd*) heavily rely on the information provided by the social channels for his/her decision-making (Secchi 2011). They utilize huge amount of information for completing their tasks. They prefer to use the information sources which are high in quality (Secchi and Bardone 2009). They take information from others with the aim to evaluate, filter and further enhance the information. The more information they have the better source is produced by maximum input from their ends.

They fully utilize their cognitive abilities and other social cognitive resources in their network to bring creativity and originality in social resources. Accordingly, it is assumed that the high quality of information is shared by *hd* and less docile shares low quality of information with others. The *hd* individuals not only enhance the information but also the social channels through which they tend to exchange information (Secchi and Bardone 2009). They facilitate the transfer of information as well as the information seeker in understanding and utilizing the information if needed. The characteristics of *hd* are summarized in Table (5.4).

Table 5.4 The characteristics of a highly docile individual.

	Passive Side of Docility				Active Side of Docility					
	Depend on SOI	Use of SOI	Quantity of SOI	Quality of info required	Enhance SOI	Create info	Quality of info created	Provide info	Quantity of info shared	Enhance SC
Highly docile	*Yes*	*Yes*	*Maximum*	*Highest*	*Yes*	*Yes*	*Highest*	*Yes*	*Highest*	*Yes*

The *hd* individuals lean on external resources (e.g. hard and soft tools) to enhance the information and an efficient medium to communicate that information (e.g. face to face interaction or a secured high-speed internet connection). The *hd* develops these skills in social environment (Secchi and Bardone 2009) with significant amount and quality of information carriers clustered around them (Secchi 2011). That is, when we look at knowledgeable and actively docile individuals, they have cluster of social resources around them for mainly two reasons; firstly, for easy and uninterrupted exchange of information, and secondly to show their knowledge and proficiency in their job. Such an individual provides very useful suggestions and comments after carefully understanding what is needed by the seeker. Docile individuals prefer to communicate information clearly with other individuals and for that purpose they tend to follow standards (Secchi 2011).

The *hd* agents are the ones who share high *qoI* and have high *qoI* sources as part of their social network which help in making appropriate decisions. They are good listeners and assist others in understanding the information they provide. Their *nfIS* from social channels is highest and is attributed through random normal distribution with a mean value of 0.75 and standard deviation of 0.05. They prefer to share better quality of information with others (Secchi 2011); the *qoI* is attributed through random normal distribution with a mean value of 0.5 and standard deviation of 0.10.

Table (5.5) shows agent types and the set of attributes assigned to them. Every agent is autonomous as has unique set of characteristics (listed in Table 5.6 with values used in simulation) which are assigned following a random-normal and random-float distribution. This means that each agent can be characterized independently from each other. Table 5.7 contains list of parameters and values assigned to them with a short description.

Table 5.5 Agents and set of attributes.

Agents	Attributes
Non-docile (*nd*)	Need for information-seeking from others (*nfIS*)
Below average docile (*bd*)	Quality of information shared (*qoI*)
Average docile (*ad*)	Payoff
Above average docile or highly docile (*hd*)	Cost of seeking information (cs)
	Cost of sharing information (csh)

Table 5.6 Types of agents and values of attributes (parameters) in simulation model.

Types of Agents	As in Simulation	*nfIS*	*qoI*
Non-docile (n-docile)		$N \approx (0, 0.1)$	$N \approx (0, 0.1)$
Below average docile (b-docile)		$N \approx (0.25, 0.05)$	$N \approx (0, 0.1)$
Above average docile (a-docile)		$N \approx (0.5, 0.05)$	$N \approx (0.5, 0.1)$
Highly docile (h-docile)		$N \approx (0.75, 0.05)$	$N \approx (0.5, 0.1)$

5.5.2 Organizational Structure.

The two organizational structures are modelled as 'formal' and 'informal'. With formal structure in place the environment imposes rigid rules (Gephart 1987) of interaction between agents and restricts them to set procedures with a little individual freedom of action (Pervaiz 1998). Formal structure restricts information sharing through communication (Catherine and Pervaiz 2003) and flow of information across functional

and hierarchical boundaries (Cross et al. 2001). These restrictions or rules affect the conditions which are essential for emergence of docility. Although, the formal structure does no function unless it truly sets limits to the informal relations that can develop inside it (Simon 1997). Apart from the restrictions imposed in formal scheme, the more positive function is to encourage the development of informal organization along constructive lines (Simon 1997). This includes, not only proper distribution of work and establishment of appropriate communication channels (Simon 1997) but also allocating tasks as per individual set of skills and abilities. This can minimize the need for the disproportionate growth of informal channels, while encouraging attitudes of cooperation within the informal structure.

Whereas, informal structures are less structured where agents are independent and have freedom to perform their relevant tasks (Sivadas and Dwyer 2000). There are no rigid rules of interaction and communication is informal and mostly face to face. As per Simon (1997:198), "the term informal organization refers to interpersonal relations in the organization that affect decisions within it but either are omitted from the formal scheme or not consistent with that scheme". Without the presence of informal organization, formal organization will not operate effectively. In informal structures, there is emphasis on interaction which is the basis of creating and sharing new knowledge (Catherine and Pervaiz 2003). The interpersonal, cross-functional and inter-organizational interactions usually enhance the richness of the organizational components (Catherine and Pervaiz 2003) where this model aims to find whether the same is true for individual docility or not.

In the model, hierarchy (h) defines patterns of interactions which are not diffused but are firmly defined into almost isolated subsets of interactions (Simon 1962). Regardless of agent's type, each agent is assigned a level in hierarchy defined by numbers from 1 to 4,

where '1' represents the top level of the hierarchy (e.g. senior executives) while '4' is the lowest level (e.g. front-line staff). The hierarchy value assists in defining rules of interaction between agents in two different organizational structures. Within the space, agents are divided according to their level of hierarchy i.e. the top executives are the (10%), executives are the (20%), middle management is (30%) and the front-line staff is (40%) of the total number of employees in the organization.

Table 5.7 Model parameters and their values.

Attributes/Parameters	Values	Description
Range	[3, 5, 7]	This defines the range of docility effect. This means that the "fitness" of individual is relative to the local niche one operates in.
Natural fitness	[1.01]	It is the cost associated with docility and is kept at lower extreme by following Simon's (1993) model.
nfIS discount	[0, 0.02, 0.05]	A discount coefficient added to fitness of all agents.
Cost of seeking rate	[0, 1, 2]	This defines the cost an agent pays to seek information. The rate is same for all the types of agents.
Cost of sharing rate	[0, 1, 2]	This defines the cost an agent pays to share information. The rate is same for all the types of agents.
Hierarchy	[1,2,3,4]	This defines the level of hierarchy at which the agent works. The hierarchy remains the same throughout the simulation runs.

Secchi (2016) and Secchi and Bardone (2009) took it a little further by defining docility in a limited social system of organization which makes it more realistic in a sense that individual have limited interaction abilities in accordance with their bounded rationality (Simon 1997; Secchi 2011). That is, individual interacts with limited number of people in a social system as he or she is unable to know the entire system, consequently individuals can only be influenced by the individuals who are closer and accessible. In

organizations, people do not know or interact with everyone resulting in limited interactions with the people who are close to them as well as limited docility effect. To simulate this reality in model, a parameter 'range' which takes values 3, 5 and 7 is used. Where 3 represents a working area where the space is limited e.g. a cubical and the possibility of interacting with others is low, 5 stands for an open plan structure where individual can interact with slightly more people and be influenced by them, and 7 depicts an open plan with an extra social space. Thus, each individual's fitness is relative to the number of individuals who are close to them (Secchi 2013) instead of the entire population (Simon 1993). Individual's fitness can be represented by their extent of docility as it contributes towards individual fitness (Simon 1993).

Fitness can be "measured in terms of the payoffs that each individual gets from the interaction with other individuals" (Secchi and Bardone 2009: 353). This leads to an assumption that individuals with high docility will tend to have higher fitness. This is because, as Simon (1993) argues, social channels embedded in the same social system will generally give advice, suggestion or information which is for one's own good. In addition, the advice coming from social channels in based on information better than one could obtain independently. To calculate agent's fitness, this study has extended Simon's (1993) model of docility by including other attributes to the agent's cognitive and behavioural attitude towards the social system of organization (discussed below). The success of each type of agents (individuals in organization) depends on how much the outcome of a "fitness" function outweighs the outcome of the "fitness" of the other type in the system (Secchi 2016). Agents may switch to one of the category which is fit for longer or attract other agents in the system to be like them for their survival in a social system. Agent's fitness is calculated after the rules of interaction are met which are discussed below.

5.5.3 Rules of interaction.

The interactional rules define what happens to an agent if two or more agents with specific characteristics meet or are closer to each other (Secchi 2016). The first rule before an agent makes an interaction is to check the hierarchical value 'h' of the other agent followed by scanning their neighbourhood for presence of any *nd* agent. Below is the brief description of both rules.

5.5.3.1 Rule no. 1. Consider level of hierarchy.

All agents move randomly but follow set of rules to interact with other agents in their vicinity in order to communicate, act and react to the influence of other agents and environment (Wooldridge and Jennings 1995) under the specified organizational structure. To implement the conditions of both "formal" and "informal" organizational structures within the simulation space, certain rules of interactions have been developed. Regardless of their "h" value, when "informal" switch is on all agents move randomly with complete autonomy while interacting with agents in their range. This depicts the informal organization where employees interact with their colleagues from different departments or same with different status in hierarchy.

Whereas, when the "formal" switch is turned on the agents can interact with agents who are in their range with certain value of 'h' within the space. The condition of "formal" organizational structure is designed to depict the hierarchy in a real-world organization where employees at the top level will make decisions by interacting with a level below or among them. Agents follow rules of hierarchy in this scenario i.e. if agent's $h = 1$ then they can only interact with agents in range who have (i) similar h value i.e. from the same level of hierarchy, (ii) h value is of a level above, and (iii) h value is of a level below.

The rule for interactions is implemented through the following algorithm. The same is depicted through the Figure no. 5.1 below.

$$S_h = A_h \ \text{ OR } \ S_h = A_{h+1} \ \text{ OR } \ S_h = A_{h-1}$$

Figure 5.1 Rules of interaction. Number in circle represents the hierarchical levels and lines reflect possible interactions as defined by the algorithm.
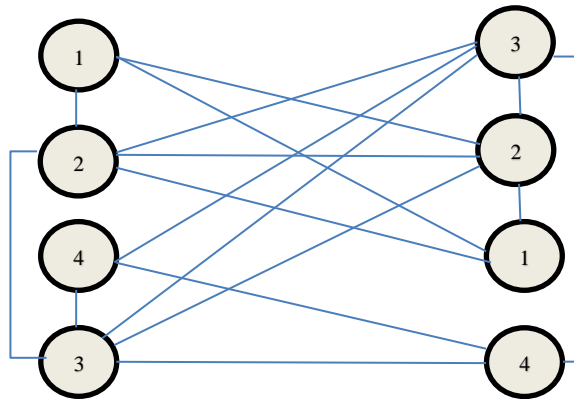
In the above algorithm, let "S" be an employee who tends to seek some information from employee "A" at hierarchical level "h". Agent "S" can interact with "A" if its hierarchical level is same as its own e.g. level 2, or is one level above i.e. level 3, or one level below i.e. level 1. When any of the conditions are met, a link is created between agents for information exchange. If none of the conditions are met, agents cannot interact with each other showing the real hierarchical scenarios within organizations, where senior management does not interact with the front-line managers for information exchange.

5.5.3.2 Rule no. 2: Non-docile should be outside the range.

Agent makes sure that there are no *nd* in their range as they don't exchange information and tend to free ride. In addition, presence of *nd* in range can influence docile agents' fitness.

The algorithm for that is:

$$A_{brr} \neq nd$$

Where:

A_{brr} stands for Agents' breed in range

nd stands for non-docile agent

On meeting the above conditions, agents start interacting and influencing each other followed by calculating fitness.

5.6 Defining the model.

The model measures fitness, the probability each single agent has of surviving in formal or informal organization comprising of autonomous agents. There are four equations for calculating fitness of four types of agents. Fitness of *nd* is equivalent to the mean of *qoI* present in the range multiplied by *qoI* and *nfIS* of *nd* added to the product of *nfIS* discount and *nfIS* of *nd*. The sum of these is further added to natural fitness. The cost of seeking information and sharing information is deducted from the total.

$$nfit = t_{nf} + t_{nfISdis} * t_{nfIS} + (t_{nfIS} * (\mu t_{qoIr}) * t_{qoI}) - t_{csi} - t_{cshi} \qquad (3)$$

Where:

t_{nf} stands for natural fitness of n-docile agent set to 1.01 as per Simon's model

t_{fdis} stands for need for information seeking discount which is set to 0.02 for each agent

t_{nfIS} stands for need for information seeking of n-docile agent

μt_{qoIr} stands for quality of information of agents who are in the defined range

t_{qoI} stands for quality of information the agent n-docile shares

t_{csi} stands for cost of seeking information the agent n-docile pays

Fitness of *bd* agents is equivalent to the mean of *qoI* present in the range multiplied by *qoI* and *nfIS* of *bd* agents added to the product of *nfIS* discount and *nfIS* of *bd*. The sum of these is further added to natural fitness. The cost of seeking and cost of sharing information are deducted from the total to give the fitness of *bd* agents.

The algorithm for calculating fitness of *bd* agents is:

$$bfit = t_{nf} + t_{nfISdis} * t_{nfIS} + (t_{nfIS} * (\mu t_{qoIr}) * t_{qoI}) - t_{csi} - t_{cshi} \quad (4)$$

Where:

t_{nf} stands for natural fitness of b-docile agent set to 1.01 as per Simon's model

t_{fdis} stands for need for information seeking discount which is set to 0.02 for agent

t_{nfIS} stands for need for information seeking of b-docile agent

μt_{qoIr} stands for *qoI* of agents who are in the defined range excluding n-docile

t_{qoI} stands for quality of information the agent b-docile shares

t_{csi} stands for cost of seeking information the agent b-docile pays

t_{cshi} stands for cost of sharing information the agent b-docile pays

Similarly, algorithms for calculating fitness of *ad* and *hd* are like the *bd* agents and are as follows:

$$afit = t_{nf} + t_{nfISdis} * t_{nfIS} + (t_{nfIS} * (\mu t_{qoIr}) * t_{qoI}) - t_{csi} - t_{cshi} \quad (5)$$

$$hfit = t_{nf} + t_{nfISdis} * t_{nfIS} + (t_{nfIS} * (\mu t_{qoIr}) * t_{qoI}) - t_{csi} - t_{cshi} \quad (6)$$

The calculated agent's fitness is assigned to their payoff. Afterwards, the interaction mode function checks for each type of agent if it has other agents in the range. If the condition is true, the function compares the mean payoff of the agents in the range with fitness of the specific agent. If the fitness of specific agent is greater than the mean payoff of agents in the surrounding, the agents change their breed to that of agent with high fitness. That means, the agents in range will adopt the fittest docile behaviour showing the social influence of real organizational environment. According to the theory, it is known that the higher fitness gives an agent a better chance of survival and influence others in the range to follow them or be in a range of similar agents.

For the agent if the calculated fitness is greater than the mean payoff of all the agents in the range then they will change their breed to that of fittest agent. This has been implemented through the following algorithms.

$$\text{fit}_a > \mu p_{ar} \qquad (7)$$
$$b_{ar} \rightarrow b_a \qquad (8)$$

Where:

fit_a stands for fitness of an agent

μp_{ar} stands for mean payoff of agents in range

b_{ar} stands for breed of agents in range

b_a stands for breed of agent with highest fitness

Therefore, in a situation where the condition as set in equation 7 is met, where fitness of an agent is greater than the mean payoff of the agents in the range the agents will mimic the locally fittest agent to survive. This implies that the employee has the greatest potential to influence their colleagues who are closer to them or are part of the team because of their characteristics. Whereas, if the condition is not met, that is, agent's fitness is less than the mean payoff of the agents in the range the agent must imitate other agents around it for its survival. This implies that the employee has lowest potential to influence their colleagues who are part of their team or closer to them.

5.7 Testing.

Upon completion, the model was checked to remove any bugs (errors) and tested by running several times to determine if the model was serving the purpose and was producing consistent results over multiple experiments. For observing change in number of any type of agents in formal or informal organizational structures, I have conducted experiments with each value of nfIS discount= 0, 0.02, 0.05. This gives total of 6 experiments, 3 for each organizational structure. This resulted in reducing the number of

parameters, consequently reducing the number of runs each experiment had to run. Each condition, comprising of a value of a parameter, is tested while keeping the rest constant. This gives the impact of a parameter in formal or informal structure on to agents' docility when the rest of the conditions are kept constant. To find the approximate impact of each value set for parameters, every condition is run 14 times. This value is generated through statistical power analysis (Cohen 1988; Secchi and Seri 2017) as this is a problem of sample size determination that is usually addressed by power analysis. As showed in recent studies (Secchi and Bardone 2017; Secchi and Seri 2017; Seri and Secchi 2017), power analysis is an efficient tool to estimate the number of runs a simulation should run. Each run is repeated 100 times. The simulation stops whenever any of the four types of agents reach more than 90% of the total number of agents and/or if one of the four types entirely disappears or when 100 steps of a single run have reached. Supposing that the structure of the data analysis is like a factorial design, the formula for ANOVA was considered appropriate (Secchi and Seri 2017). The range of power levels that are considered acceptable for computer simulation is $>= .90$ (Ritter et al. 2011) as it is an artificial system which can meet higher conditions. Whereas the effect size is chosen to be 0.2 indicating a small effect size (Cohen 1988). The standard tolerance for Type-I error with $\alpha = 0.05$ was maintained. The total number of parameters combinations is (see Table 2) is 2 x 2 x 2 x 2 x 3 x 3 x 3 = 432. The number of runs that satisfy this condition is 14. The design of the experiments times the number of runs per condition gives a total of 6048 runs of the model. The starting numbers of the four types of agents in the model is assumed to be 25. This assists in providing same initial starting conditions and opportunities to all agents, independent of their type. The experiments have the potential to provide some meaningful information regarding the influence of organizational structure and other conditions for docility to emerge, stabilize or disappear within

organizational environment. We can find if individual's docile attitude (information-seeking and sharing from others) depends on the organizational structure, cost of sharing information or it relies on individual's fitness. If the findings show that docility is independent of these conditions, then this concept is far stronger than what Simon and other researchers of docility have highlighted in the previous studies.

5.8 Results.

For the statistical analysis and presentation of figures, I have used an open source software called RStudio (R Core Team 2013). The experiments resulted in six excel files (CSV format): three files for formal and three files for informal structure with different values of nfISdis = 0, 0.02, 0.05. Results are presented using plots generated by setting different values of *csr* (0, 1, 2). The co-plots present each type of individual (i.e. n-docile, b-docile, a-docile, and h-docile) in two different scenarios (formal and informal organizational structure) with three different values of *range* (3, 5, 7) and *cshr* (0, 1, 2). The co-plots assist in analysing the effect on the parameter held constant when the other two parameters differ. The numbers in the horizontal axis are the steps of the runs, this is labelled as opportunities of interaction as agents change their location and meet new agents with every step of the simulation model.

5.8.1 Adapting in interactive environment.

Figures 5.2 and 5.3 show variations in numbers of *nd* individuals in formal and informal organizational settings respectively. As expected, when the costs are high, most of the individuals will tend to switch to a non-docile type, regardless of the range of interactions. The figures show that whenever cost of seeking rate (*csr)* is high, there is always an increase in *nd*. No matter how strong, none of the other parameter values are capable of changing the trend. The range of interactions do play a part, the number of *nd* increases

steadily when *range*= 3, whereas when *range* = 7, the increase is sudden and tends to

remain stable.

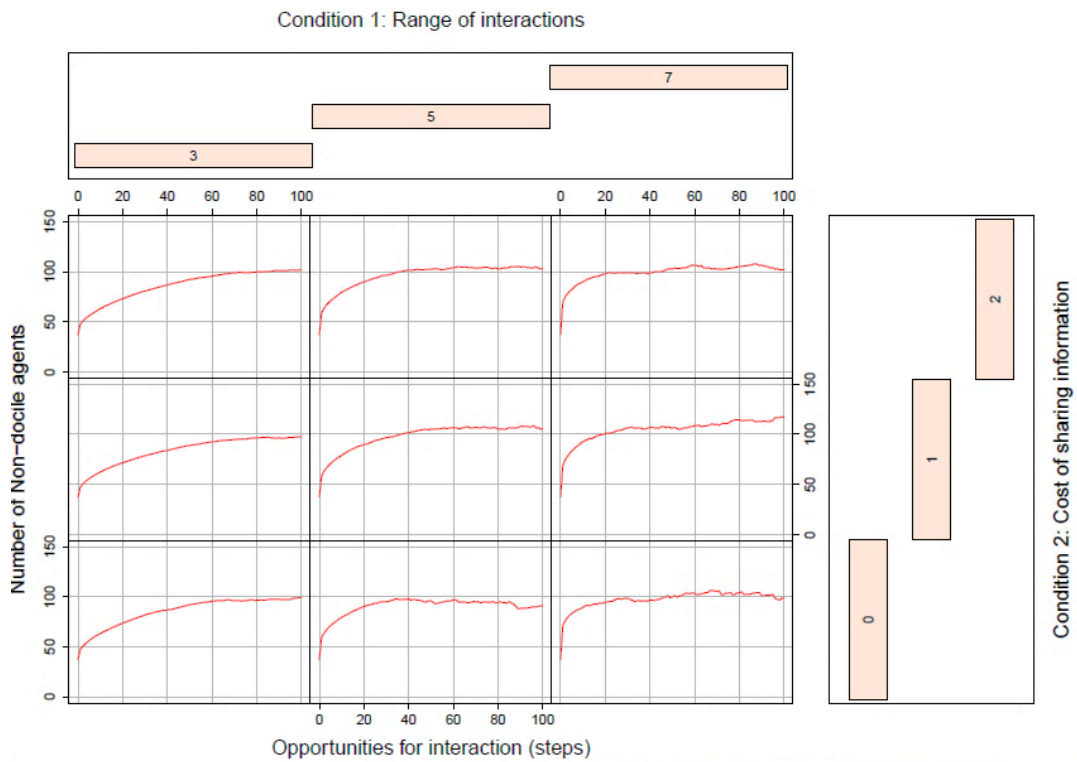Figure 5. 2 Number of nd for nfISdis = 0.02 and csr = 2, given cshr and range in formal structure.
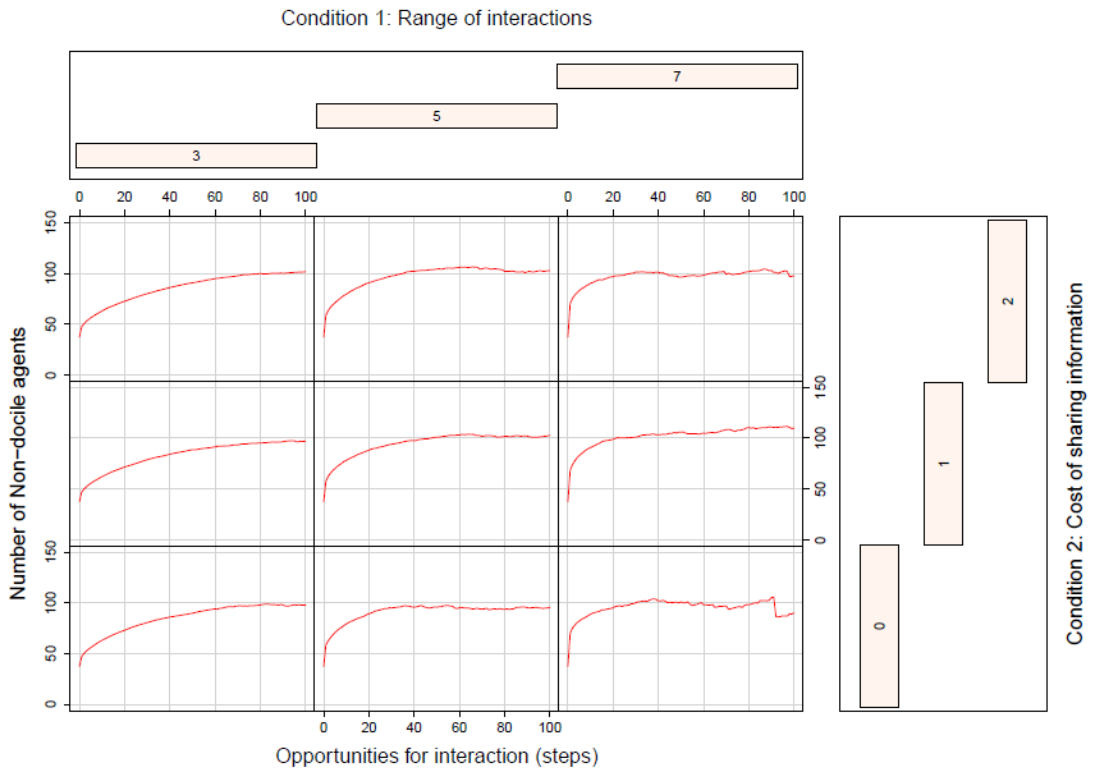
Figure 5.3 Number of nd for nfISdis = 0 .02 and csr = 2, given cshr and range in informal structure.

Condition 1: Range of interactions

Remember, *nd* are the ones who do not significantly rely on *SOI* and tend to avoid paying any costs and making social interactions. Hence, when organization imposes high costs on seeking and sharing information, number of *nd* increase as mimicking such a behaviour will fit in the system for better survival. The exceptions can be seen in sudden decrease in numbers of *nd* in the formal setting when the range of interactions is highest, and opportunities of interactions are particularly high too i.e. closer to 100 with no cost of sharing to pay. Here the real features of *nd* can be observed, that they don't like interacting with people and are exposed to many people who are willing to exchange information. Where, *nd* does not understand the significance of making social interaction or using it as a mean to transfer information even when there is no cost of sharing to pay. It is shown that few number drop out i.e. agents change their behaviour from *nd* to docile type as its more favourable when there is no cost to pay and many people to interact with.

A t-test confirms that *nd* numbers vary significantly with respect to changes in *range* within formal structures when $csr = 2$, $cshr = 0$ —$t = -18.32$, $df = 12884$, $p < .001$— for $nd_{range} = 3$ and $nd_{range} = 7$. Although, there is no significance in the variation of numbers of *nd* when the costs are high i.e. $csr = 2$, $cshr = 2$ and range is moderate to high i.e. *range* = [5, 7]. The t-test results are: $t = 0.787$; $df = 21101$, $p = .4312$ with $mean_{nd[range=5]} = 93.682$ and $mean_{nd[range=7]} = 93.380$. That means, the number of *nd* will increase if the costs imposed on seeking and sharing are set to highest values within a formal structure. However, there is statistical significance in variation of *nd* numbers within informal structure under range = [5, 7]. The t-test results as: $t = -2.374$; $df = 2168$; $p = .0175$ with $mean_{nd[range=5]} = 92.775$ and $mean_{nd[range=7]} = 93.694$. This can be inferred that imposing rules of interaction in a formal structure does not have a great influence on the variation in numbers of *nd* individuals and however there is a slight influence on the numbers within informal structures where agents are free to interact with anyone regardless of their hierarchical levels. However, the main finding is related to non-docile behaviour being popular whenever there are high costs imposed on information-seeking and sharing as well as increasing the range of interactions. This is shown by the successful adaptation of *nd* agents in both formal and informal scenarios where costs of seeking and sharing information are set to highest values.

Similarly, test shows significant variation in results when *cshr* is at 1—$t = -41.237$, $df = 21626$, $p < .001$—considering $nd_{range} = 3$ and $nd_{range} = 7$. Whereas, the number of *hd* and *ad* decreases with high costs as they extensively rely on exchanging information and willingly pay costs and such conditions do not favour their behaviour (as in Figures 5.4 and 5.5 as in informal settings). The *hd* always decline, sometimes reaching numbers that are very close to zero, specifically with higher range of interaction. They tend to switch to *nd* or *bd* to adapt to the environment for their survival.

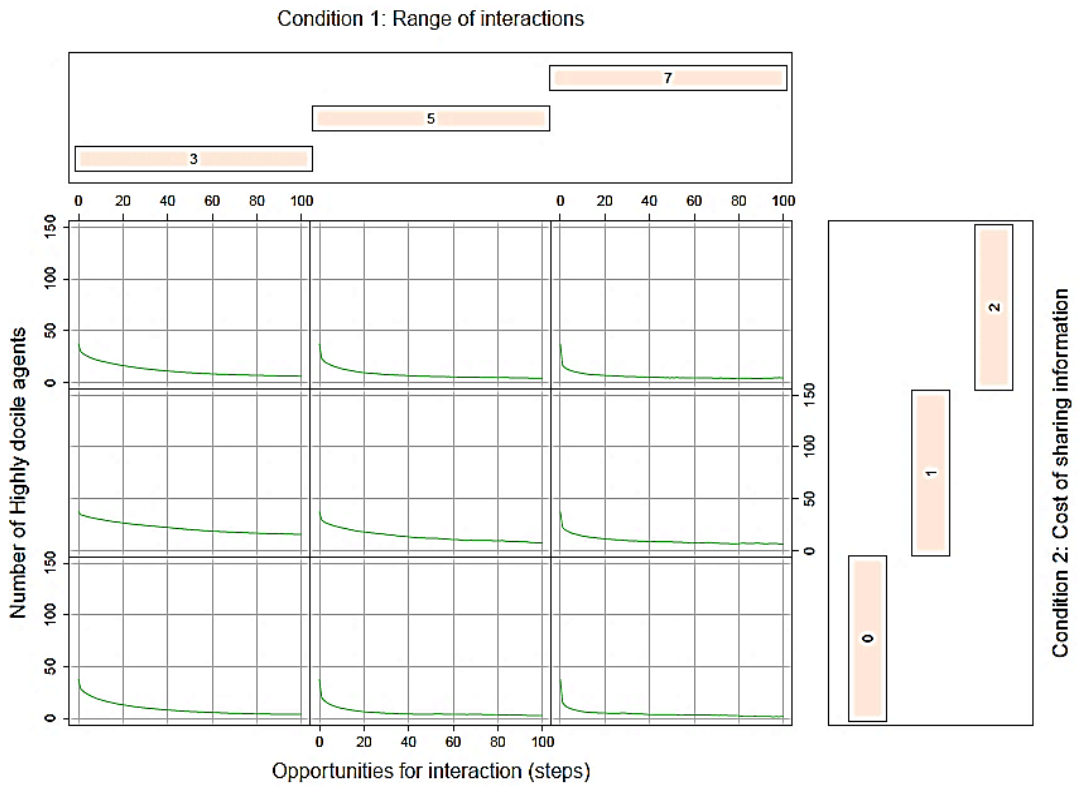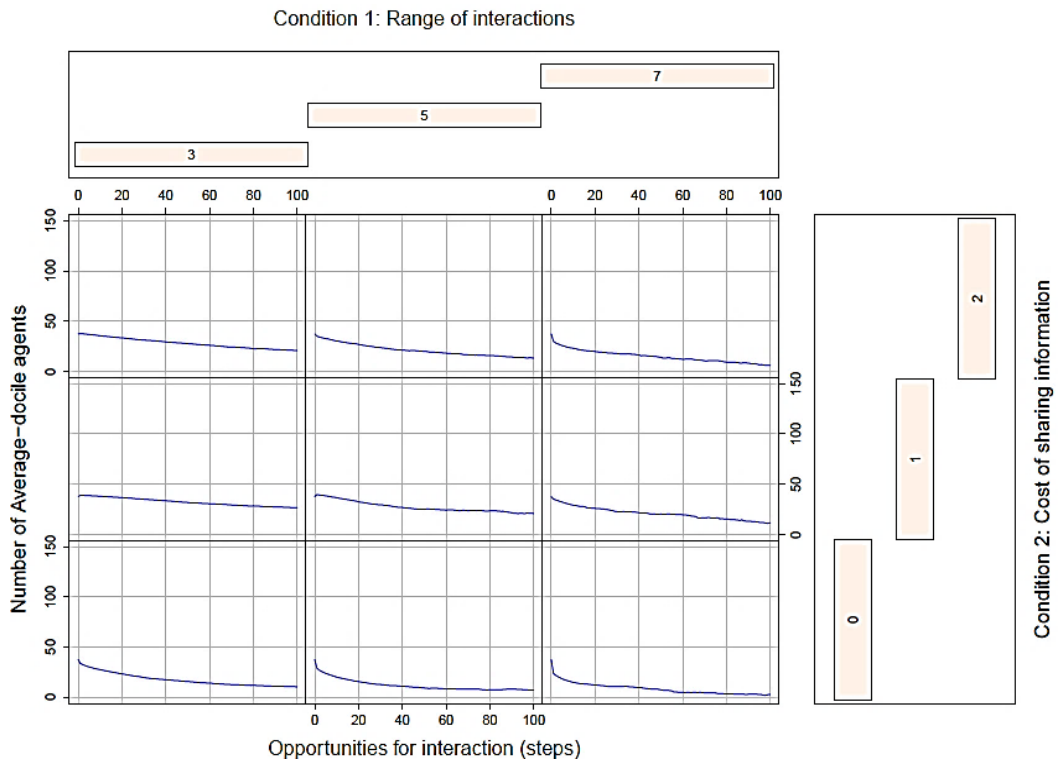*Figure 5.4 Number of hd for nfISdis = 0.02 and csr = 2, given cshr and range in informal structure.*

Figure 5. 5 Number of ad for nfISdis = 0.02 and csr = 2, given cshr and range in informal structure.

As expected that agents will be more attracted to change into *nd* when organization impose high costs of seeking and sharing, i.e. discouraging to be actively docile. The same is depicted in the figures above. Looking at the results of distribution of *nd* in relation to the distribution of other three types of docile agents can give a clearer picture of the role of cost of seeking and sharing and range of interactions. The distribution of *nd* when $csr = 2$, $cshr = 2$, and $range = [5,7]$ is significantly different from bd —$t = -15.911$, $df = 17393$, $p < .001$— from ad —$t = 23.779$, $df = 20519$, $p < .001$— and from hd —$t = 16.274$, $df = 21282$, $p < .001$— with $mean_{nd[range=7]} = 93.980$, $mean_{bd[range=7]} = 23.798$, $mean_{ad[range=7]} = 19.818$, and $mean_{hd[range=7]} = 7.607$. This finding highlights the conditions which are favourable for the non-docile behaviour to be popular. Looking at the mean of the different number of agents when costs and range are set to the highest values, *nd* holds the highest mean i.e. 93.98 and *hd* has the lowest mean i.e. 7.60.

The distribution of *nd* is significantly different when $csr=1$, $cshr=1$, and $range = [3, 5]$. The *nd* distribution is: —$t = -23.659$, $df = 31717$, $p < .001$— different from bd —$t = 13.562$, $df = 31683$, $p < .001$— as well as different from ad —$t = 35.492$, $df = 32708$, $p < .001$— and finally from hd —$t = 45.23$, $df = 34923$, $p < .001$—with $mean_{nd[range=3]} = 85.491$, $mean_{bd[range=3]} = 24.580$, $mean_{ad[range=3]} = 26.840$, and $mean_{hd[range=3]} = 12.040$. Similarly, looking at these results, it can be stated that *nd* individuals tend to increase and fit in an organizational environment when information-seeking and sharing is discouraged by imposing high costs and providing low to medium *range*. *Non-docile* benefit from these conditions and tend to increase whereas, the docile tend to decrease in numbers.

As far as other conditions are concerned, looking at Figure 5.6, one can notice decrease in *nd* numbers when *csr* = 0, cshr = [0, 1, 2], and *range* = 7, but the numbers do not fall below 25. The number of *nd* try to increase steadily and stabilize in such conditions, reaching maximum to 50. Similar changes happen in informal scenarios. It is inferred from the plot that whenever there is no cost of seeking imposed by the organization, the number of *nd* is low due to the successful popularity of the docile behaviour which emerge when organizations encourage information exchange by not imposing any costs and providing maximum opportunities to interact freely.

Figure 5.6 Number of nd for nfISdis = 0.05 and csr = 0, given cshr and range in formal structure.
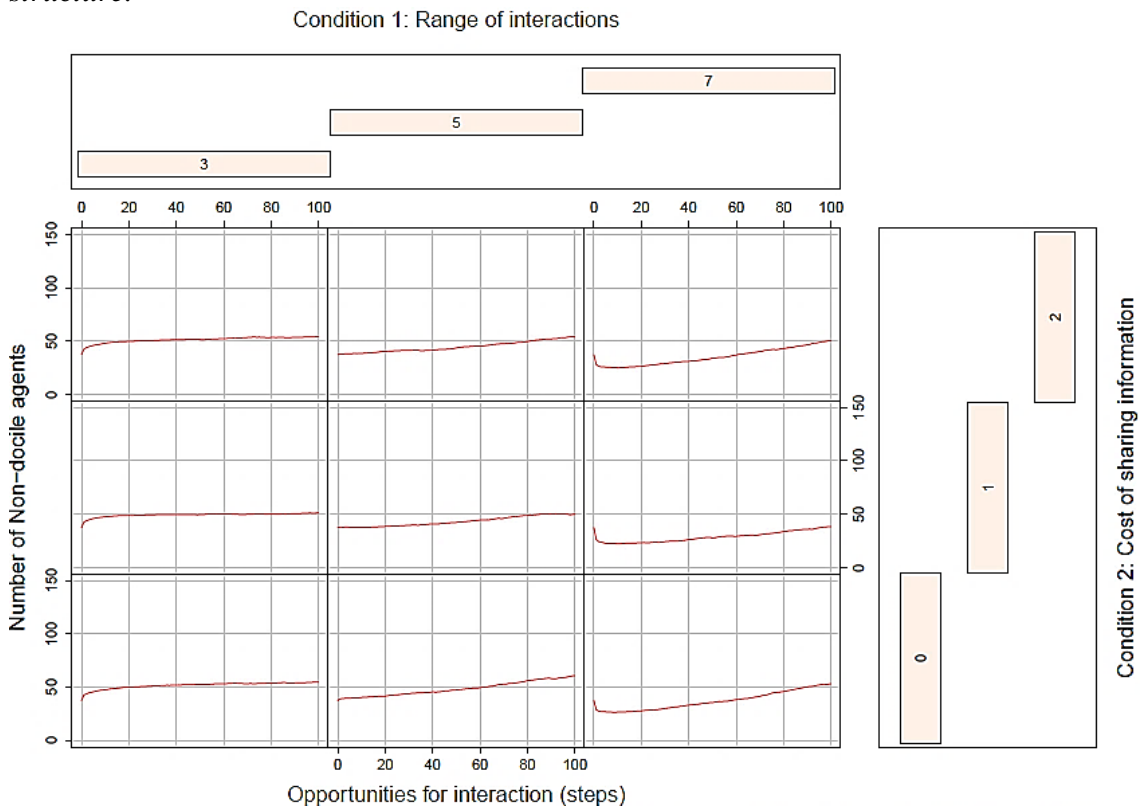
5.8.2 Selfish do not die.

Interestingly, the selfish docile (*bd*) are the ones who never seem to increase or diminish in numbers in any of the given conditions as can be seen in Figures 5.7 and 5.8 below. The only exception is when there is *csr* = 1, *cshr* = 0 and *range* = 7 in a formal

environment, where the number of *bd* tries to increase in the last twenty interactions. This shows that the selfish docile do not die. Where, Simon (1990,1993) presented the social side of BR through docility by speculating that individuals behave altruistically in contemporary human societies resulting in a docile environment where the survival of the unfit i.e. selfish (*non-docile*) diminishes with the passage of time. However, this is unrealistic as we still find people around us in society who survive with selfish behaviour (Secchi and Bardone 2009).

Figure 5.7 Number of bd for nfISdis = 0.05 and csr = 1, given cshr and range in formal structure.
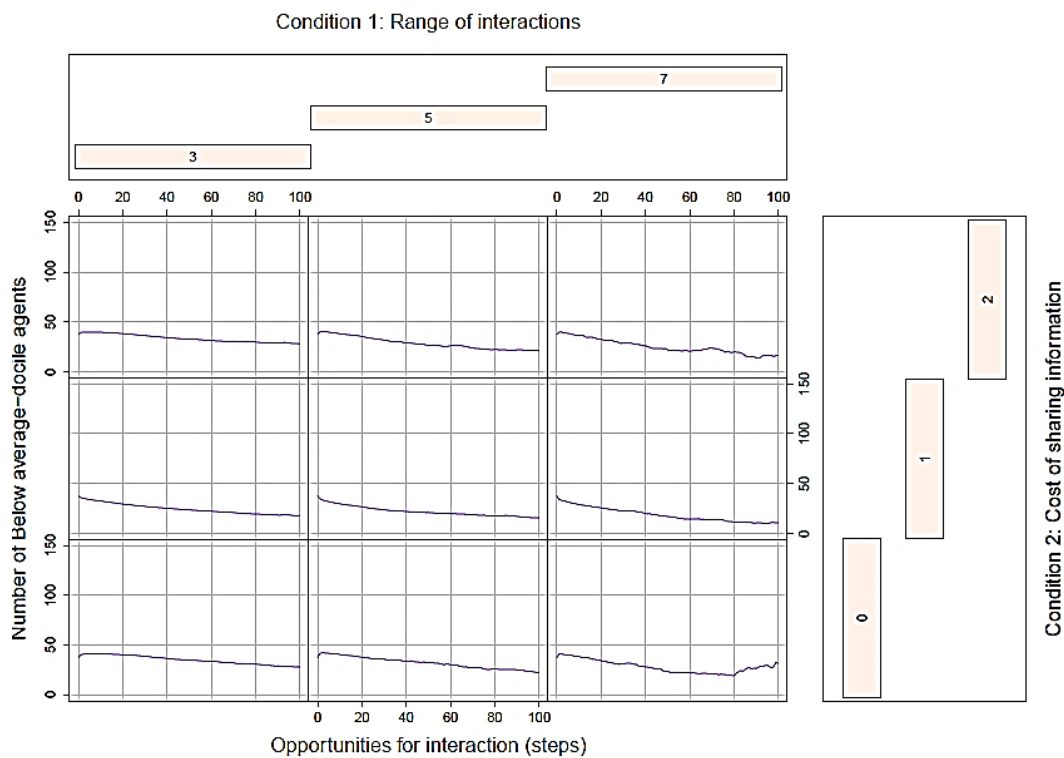
Figure 5.8 Number of bd for nfISdis = 0.05 and csr = 1, given cshr and range in informal structure.
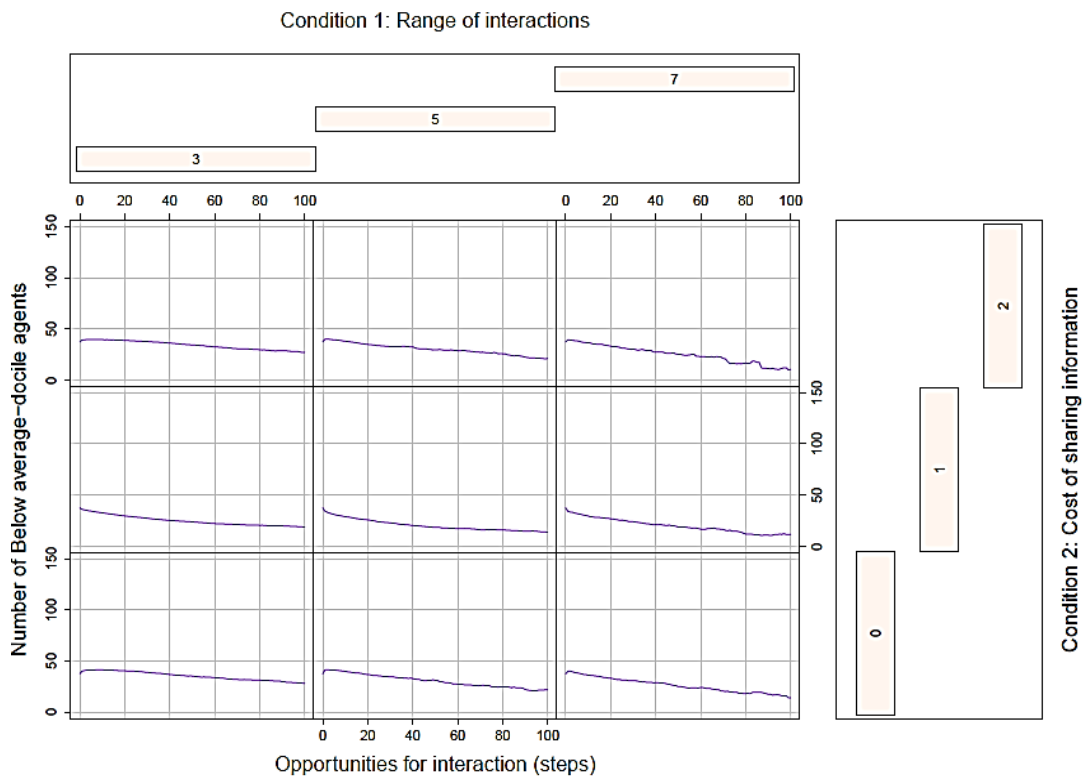
Individuals may not be entirely selfish or altruistic as their behaviour towards the social system varies with respect to their situation. Secchi (2007,2011,2016) and the later contribution by Secchi and Bardone (2009,2013) have followed the same idea with less technicalities as they present an individual's altruism as a by-product of dynamic individual's docile behaviour. That is, docility becomes a compulsory condition to make altruism emerge (Simon 1993; Secchi 2007).

There is a steady decrease in numbers in most conditions although this is not always very strong. Figures 5.7 and 5.8 show that *bd* numbers decrease but do not go down too much that they diminish. A t-test shows that *bd* numbers vary significantly in a formal structure when $csr = 1$, $cshr = 0$ — $t = 6.6825$, $df = 10104$; $p < .001$— for $bd_{range=3}$ and $bd_{range=7}$ with $mean_{bd[range=3]} = 35.797$ and $mean_{bd[range=7]} = 34.140$. Looking at the t-test conducted for the same conditions but in informal scenario shows statistically significant variations

in *bd* numbers— $t = 14.197$, $df = 1130$, $p < .001$— for $bd_{range=3}$ and $bd_{range=7}$ with $mean_{bd[range=3]} = 36.164$ and $mean_{bd[range=7]} = 32.890$. The results of the t-tests imply that the rules of interaction (formal vs informal) can increase the difference in variation of numbers of *bd*; more difference in *bd* numbers is shown in informal structure.

Additionally, range is also a factor which is causing statistically significant variations in the number of *bd* individuals. Looking at the influence of costs now, the test[5] confirms statistically significant variation in numbers of *bd* individuals in formal hierarchical structures when cost of seeking is high, i.e., csr = [1, 2]. Likewise, test shows statistically significant variations in the number of *bd* individuals in informal hierarchical structures. Results show similar and significant variations in both scenarios.

Similarly, the results from t-tests[6] confirm the influence of high cost of sharing information, i.e., cshr = [1,2], on changes in number of *bd* individuals. In addition, it is confirmed that *bd* individuals tend to survive with low numbers under both formal and informal rules of interaction and high costs imposed by the organization.

5.8.3 Encouraging cooperation.

Figures 5.9 and 5.10 represent increase and decrease in the number of *ad* individuals. This type depends extensively on exchanging information with others. Hence, they prefer conditions where organizations do not impose heavy costs on seeking and sharing information. The more they seek and share, the less they pay. The results show, when

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[5] For formal scenario, when $csr = [1, 2]$ — $t = 40.89$, $df = 1360$, $p < .001$—for $bd_{range=7}$ and $cshr = 2$ with $mean_{bd[csr=1]} = 32.39$ and $mean_{bd[csr=2]} = 22.506$.
For informal scenario, when $csr = [1, 2]$ — $t = 43.99$, $df = 1352$, $p < .001$—for $bd_{range=7}$ and $cshr = 2$ with $mean_{bd[csr=1]} = 33.045$ and $mean_{bd[csr=2]} = 22.012$
[6] For formal scenario, when $cshr = [1, 2]$—$t = -59.37$, $df = 16320$, $p < .001$—for $bd_{range=7}$ and $csr = 2$ with $mean_{bd[cshr=1]} = 12.227$ and $mean_{bd[cshr=2]} = 22.506$.
For informal scenario, when $cshr = [1, 2]$ —$t = -61.53$, $df = 16320$, $p < .001$—for $bd_{range=7}$ and csr = 2 with $mean_{bd[cshr=1]} = 11.597$ and $mean_{bd[cshr=2]} = 22.012$

there is no cost of seeking, the number of *ad* tends to increase. However, when *cshr* = 2

and *range* = 7, the number of *ad* individuals increases and then stabilizes until 60

interactions and then decrease steadily (upper right corner) but does not fall down below

60 individuals. It is the range and cost of sharing information which influence the

numbers of *ad* individuals remarkably in both formal and informal settings when there is

no cost of seeking imposed by the organization i.e. *csr* = 0.

Figure 5.9 Number of ad for nfISdis = 0.05 and csr = 0, given cshr and range in formal structure.
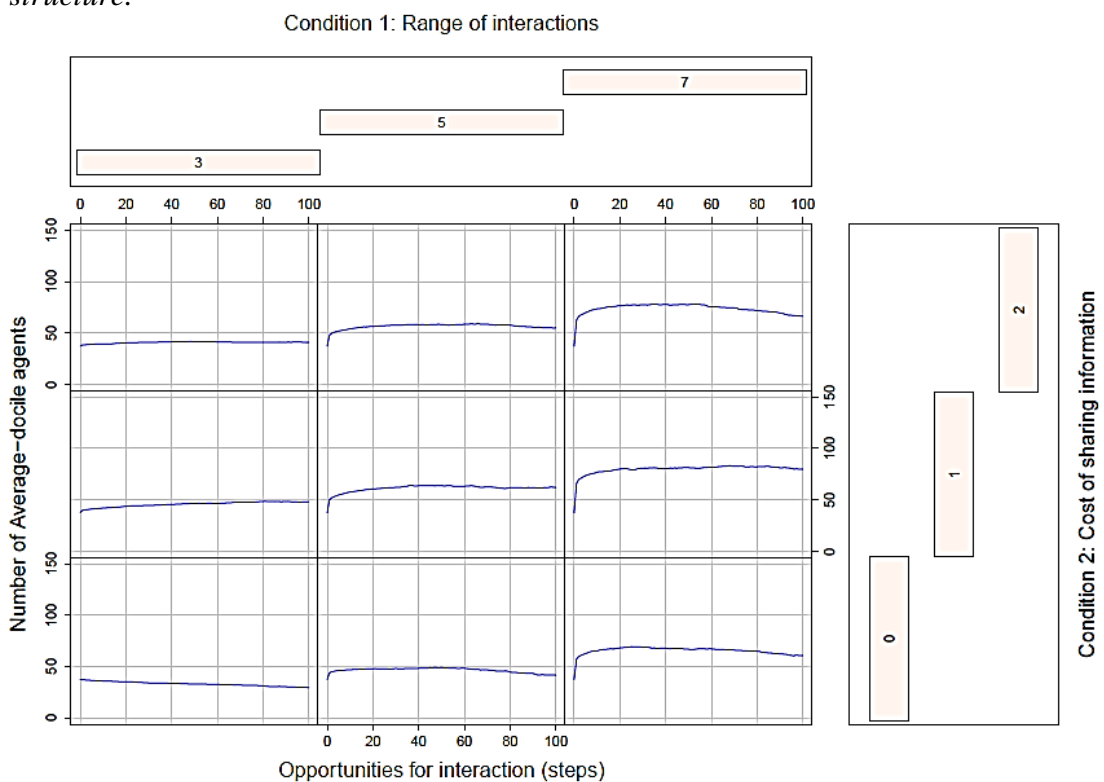
Figure 5.10 Number of ad for nfISdis = 0.05 and csr = 0, given cshr and range in informal structure.
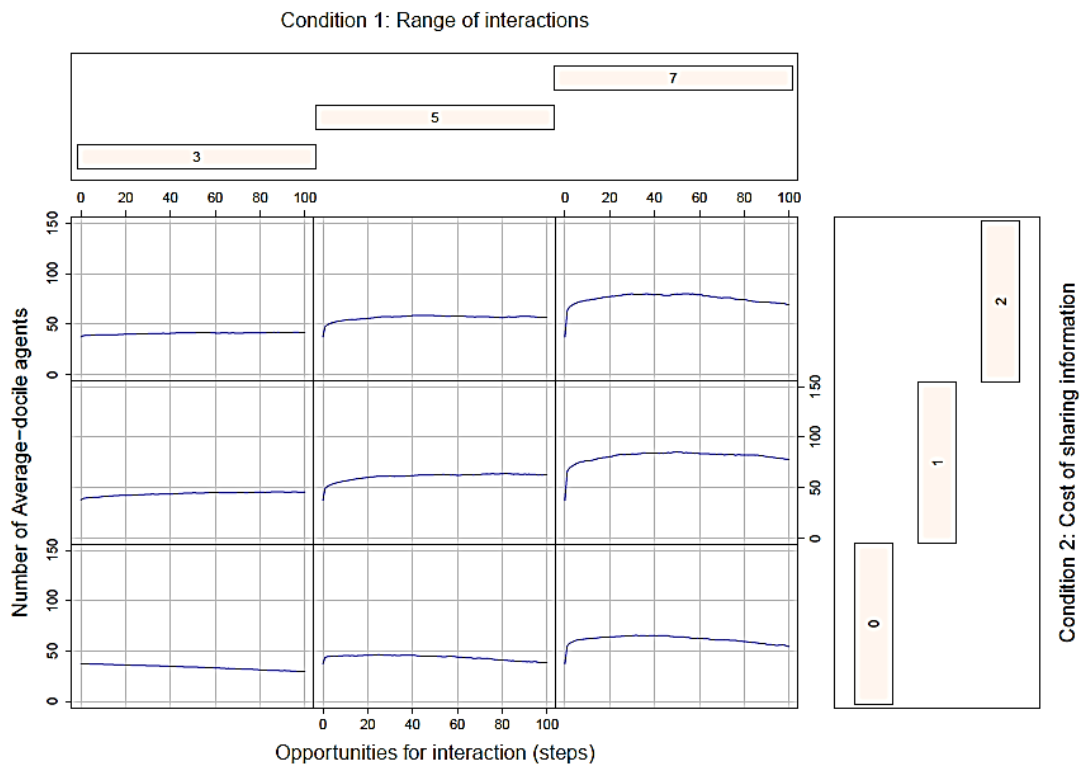
As shown in Figure 5.9, the number of *ad* individuals increases in informal organizational environment, when range of interactions is highest, and cost of sharing is not too high. That is, when organizations encourage cooperation by not introducing any costs on seeking information and imposing low costs on sharing information while providing chances of maximum range of interactions, this type of docile individuals increase in numbers. The *ad* individuals delegate their cognitive activities to more social channels and also help as many as they meet, making the docility effect strong enough to let others mimic this behaviour in these conditions. Consequently, making conditions favourable for the increase and survival of *ad* individuals among the rest of the types. A t-test shows a statistically significant variation in numbers of ad individuals when *csr* = 0 and *cshr* = 0 — t =-127.94, *df* =22846, p <.001— for $ad_{range=3}$ and $ad_{range=7}$ with $mean_{ad[range=3]}$ =33.321 and $mean_{ad[range=7]}$ = 65.438. Likewise, in the informal structure, the t-test shows

a statistically significant change in number of *ad* individuals when $csr = 0$ and $cshr = 0$ — $t = -108.4$, $df = 2307$, $p < .001$— for $ad_{range=3}$ and $ad_{range=7}$ with $mean_{ad[range=3]} = 34.101$ and $mean_{ad[range=7]} = 61.663$. The results confirm changes in *ad* numbers due to changes in range of interaction. The increase in range, increases the number of *ad* individuals in both formal and informal scenarios. However, the difference in *ad* numbers, due to variation in range, is low in informal scenarios. In addition, a series of tests[7] show that there is a statistically significant variation in the number of *ad* individuals when there is a change in either cost of seeking or cost of sharing information within both formal and informal structures.

Another series of t-tests has shown that distribution of *ad* in relation to the distribution of other three types of agents can give more information about the role of cost of seeking and sharing, and range of interactions. The distribution of *ad* when *nfISdisount* = 0.02 in a *formal* structure, *range* = [5,7] and $csr = 1$, $cshr = 1$ as per t-test is: $t = 18.053$, $df = 1836$, $p < .001$ which is significantly different from only *bd* — $t = -10.3665$, $df = 16350$, $p < .001$ — with $mean_{ad[range=7]} = 18.896$ and $mean_{bd[range=7]} = 24.671$ as shown by the t-tests. Whereas, the difference of distribution is less significant as compared to *hd*— $t = 2.775$, $df = 1777$, $p = .005$ — with $mean_{hd[range=7]} = 7.918$ and not statistically significant from *nd* — $t = -1.899$, $df = 1831$, $p = .057$— with $mean_{nd[range=7]} = 94.084$.

The results imply that there isn't a significant change in numbers due to the change in environment or rules of interaction. It is the variation in costs of seeking and sharing rates

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[7] For formal scenario, when $csr = 0$, $cshr$ [1,2] — $t = 13.54$, $df = 2920$, $p < .001$— for $ad_{range=7}$ and with $mean_{ad[cshr=1]} = 80.258$ and $mean_{ad[cshr=2]} = 70.514$.
For informal scenario, when $csr = 0$, $cshr$ [1,2] — $t = 14.23$, $df = 2868$, $p < .001$— for $ad_{range=7}$ and with $mean_{ad[cshr=1]} = 78.930$ and $mean_{ad[cshr=2]} = 73.878$.
For formal scenario, when $csr = 2$, $cshr$ [1,2] — $t = 33.73$, $df = 1921$, $p < .001$— for $ad_{range=7}$ and with $mean_{ad[cshr=1]} = 25.818$ and $mean_{ad[cshr=2]} = 19.213$.
For informal scenario, when $csr = 2$, $cshr$ [1,2] — $t = 25.75$, $df = 2069$, $p < .001$— for $ad_{range=7}$ and with $mean_{ad[cshr=1]} = 25.830$ and $mean_{ad[cshr=2]} = 20.723$

which influence number of *ad* individuals. It is concluded that there is a decrease in *ad* numbers when costs of seeking and costs of sharing are high.

Similar patterns in variation of numbers of *hd* can be seen when organizations introduce mechanisms, which encourage its employees to help each other by exchanging information, aiming to complete their daily cognitive activities. In Figure 5.11, *hd* individuals increase in numbers in both formal and informal settings when there are no costs of seeking and sharing information but *range* = 3. The *hd* individuals find these circumstances as favourable as they extensively rely on exchanging information with other individuals and are willing to pay the costs. However, the higher range of interactions (5 and 7) seem to decrease their number especially when there is cost of sharing imposed by the organization. It is worth noting that the range of interactions play crucial role for *hds* in that the more individuals they interact with the more information can be exchanged and more social cognitive resources they have. However, from Figures 5.11 and 5.12 the number of *hd* depends on the range as well as the cost of sharing information. The number of *hd* decrease with an increase in range and high cost of sharing in both formal and informal organizational setups.

A series of t-tests confirm that *hd* numbers vary significantly with respect to changes in *range* within formal structures when $csr = 0$, $cshr = 0$ —$t = 34.353$, $df = 3679$, $p < .001$— for $hd_{range} = 3$ and $hd_{range} = 5$ with $mean_{hd[range=3]} = 53.006$ and $mean_{hd[range=5]} = 46.074$. Similar results are found in informal structures when $csr = 0$, $cshr = 0$ —$t = 30.916$, $df = 3706$, $p < .001$— for $hd_{range} = 3$ and $hd_{range} = 5$ with $mean_{hd[range=3]} = 52.520$ and $mean_{hd[range=5]} = 46.233$.

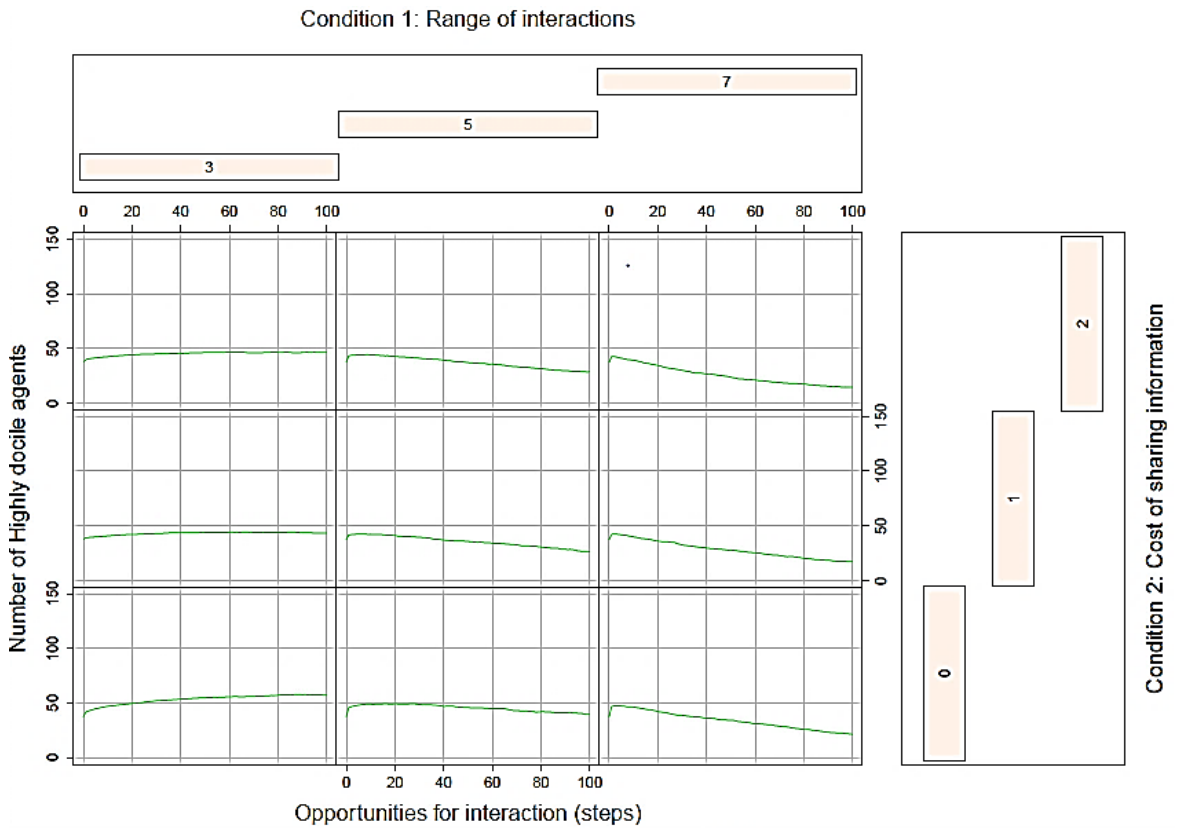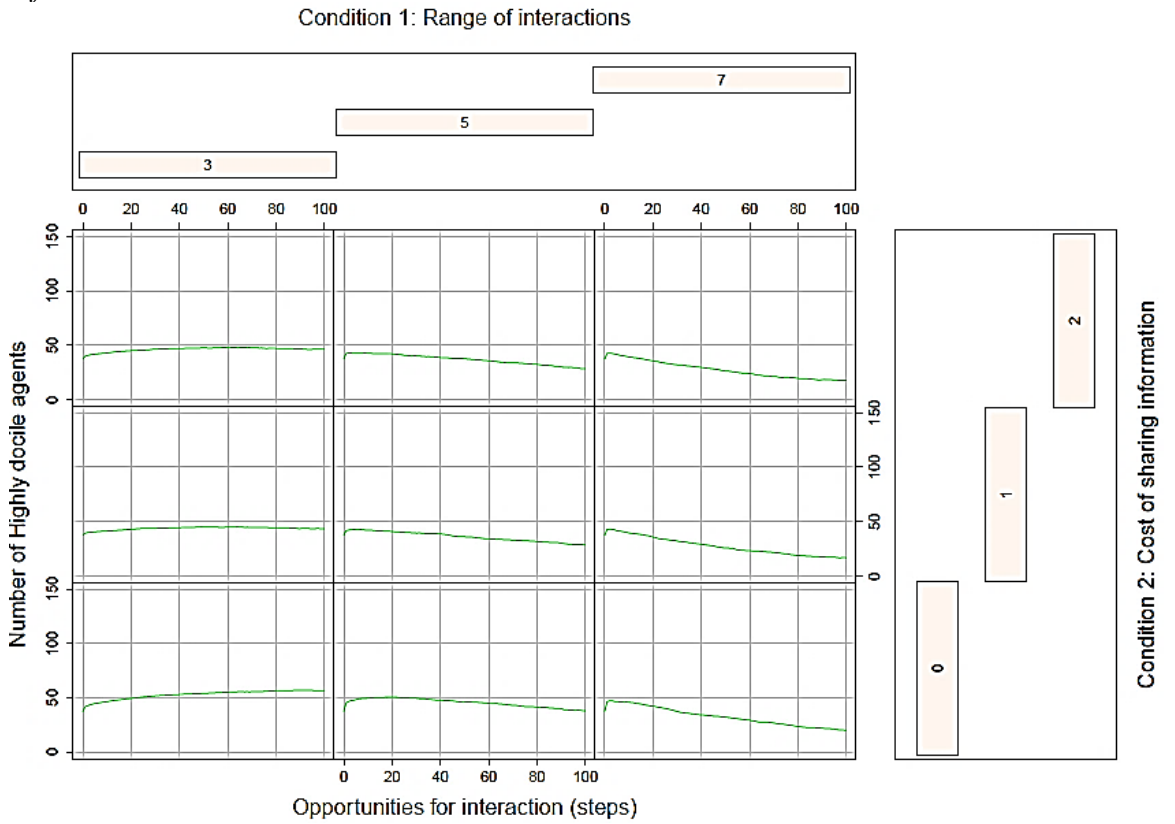*Figure 5. 11 Number of hd for nfISdis = 0.05 and csr = 0, given cshr and range in formal structure*

Figure 5.12 Number of hd for nfISdis = 0.05 and csr = 0, given cshr and range in informal structure

Following the same pattern, results confirm that there is a statistically significant variation in *hd* numbers in formal and informal structure with highest range. Variation in *hd* numbers when $csr = 0$, $cshr = 0$ —$t = 49.618$, $df = 3323$, $p < .001$— for $hd_{range} = 5$ and $hd_{range} = 7$ with $mean_{hd[range=5]} = 46.074$ and $mean_{hd[range=7]} = 35.639$. Likewise, results show similar variation in *hd* numbers in informal structure when $csr = 0$, $cshr = 0$ —$t = 58.717$, $df = 3341$, $p < .001$— for $hd_{range} = 5$ and $hd_{range} = 7$ with $mean_{hd[range=5]} = 46.233$ and $mean_{hd[range=7]} = 34.139$. It can be concluded that variation in range in both formal and informal structures bring significant changes in *hd* numbers when there are no costs imposed. Although the variation in *hd* numbers is lower in informal structures. Unexpectedly, the *hd* numbers decrease with an increase in range of interactions even when there are no costs imposed in both formal and informal structures. In addition, it can be said that relaxing the rules of interaction (informal structures) and encouraging exchange of information through minimum or low range of interaction (within a team or department) can influence the variation in *hd* numbers. The reason of decrease in *hd* number with an increase in range can be due to *hd* individual's dependence on high quality of information; the variation in range of interaction does not ensure increase in the quality of information ready to be shared through social channels. To be precise, the increase in range is not based on docile individual's choice of including their favourite knowledgeable social channels. Range is a parameter which may allow individuals to be exposed to more resources ready to be manipulated within a social environment. Whereas, *hd* and ad prefer to interact with like-minded individuals whom they trust and have a knowledge about their skills.

Similarly, when there are changes in cost of seeking and sharing, tests show that the *hd* number changes significantly in both scenarios. A series of t-tests show decrease in number of *hd* individuals when the costs are increased i.e. $csr = 2$, $cshr = [1, 2]$ with

maximum *range* = 7 — t =34.346, *df* =1893 p <.001— for $hd_{[cshr=1]}$ =12.275 and *mean*$_{hd[cshr=2]}$ =8.1334. The results confirm that changes in costs influence changes in numbers of *hd* individuals.

Looking at the results of distribution of *hd* in relation to the distribution of other three types of agents (*nd, bd* and *ad*) can give a clearer picture of the role of cost of seeking and sharing rates, and range of interactions in variation of *hd* numbers. The distribution of *hd* is significantly different from other agents when *nfISdis*= 0.02 when *csr* = 1, *cshr* = [0,1] and *range* = 3 — t = -21.86, *df* = 3997, p < .001— such as from *bd* the t-test shows—t = 79.49, *df* = 37182, p < .001— from *ad* —t = -65.783, *df* = 3980, p < .001— and from *nd* —t = -6.776, *df* =3979, p < .001— with *mean*$_{hd[cshr=1]}$ =12.040, *mean*$_{bd[cshr=1]}$ = 24.580, *mean*$_{ad[cshr=1]}$ =26.840, and *mean* $_{nd[cshr=1]}$ = 85.4921. These results show that the numbers of agents vary significantly when range of interaction is lowest, cost of seeking is moderate, and cost of sharing is low to moderate. Results confirm that the conditions which impose costs for seeking and sharing information are not suitable for *hd* number, hence they change with respect to the values of costs. In addition, it is confirmed that these conditions are favourable for non-docile to increase in numbers.

I have checked the variation by increasing range of interactions just to see if that can change the pattern of distribution and improve the *hd* numbers. A series of t-tests show significant variation in agents' number as compared to *hd* when *csr*=1, *cshr*= [0, 1] and *range* = 7. The *hd* distribution is: —t = -4.980, *df* = 1467, p < .001— different from *bd* —t = 37.138, *df* = 1352, p < .001— as well as different from ad —t = -29.256, *df* = 1566, p < .001— and finally from *nd* —t = -13.927, *df* = 1536, p < .001— with *mean*$_{hd[cshr=1]}$ =7.918, *mean*$_{bd[cshr=1]}$ = 24.671, *mean*$_{ad[cshr=1]}$ =18.896, and *mean* $_{nd[cshr=1]}$ = 94.084. Yet again, *nd* dominates with higher numbers and *hd* numbers are the lowest. Results confirm

that when costs are imposed, no matter what the range of interaction is, the non-docile behaviour prevails.

Just to avoid any confusion and to answer questions like: What happens to the *hd* distribution when there are no costs imposed and range of interaction is highest? A series of t-tests show significant variation in agents' number as compared to *hd* when *csr*=0, *cshr*= 0 and *range* = [5,7]. The *hd* distribution is: —$t = 49.186$, *df* = 3300, $p < .001$— different from *bd* —$t = -34.042$, *df* = 2847, $p < .001$— as well as different from ad —$t = -64.869$, *df* = 2998, $p < .001$— and finally from *nd* —$t = 46.192$, *df* = 3329, $p < .001$— with mean of agents when range= 5: *mean_{hd}* =46.298, *mean_{bd}* = 10.003, *mean_{ad}* =45.677, and *mean _{nd}* = 47.54. The results show significant variation in mean of agents when range =7: *mean_{hd}* =35.875, *mean_{bd}* = 13.498, *mean_{ad}* =64.029, and *mean _{nd}* = 36.790. Finally, the increase in range has influenced the active docile behaviour (*ad*), however the *hd* numbers have fallen down but not too low. Whereas, the *bd* has increased and *nd* has decreased. In short, the agent *ad* benefits from these conditions and tend to increase in number. Hence, it is confirmed that when there are no costs imposed on seeking and sharing information and individuals are provided with high range of interactions, the docile behaviour overcomes the non-docile behaviour. Whereas, the rules of interaction do not influence the variation in numbers of agents.

5.9 Summary.

This chapter was focused to answer two questions: (1) if there is any effect of organizational characteristics — namely formal and informal rules of interaction, costs imposed on seeking and sharing information, and range of interaction— on individual docility? (2) if yes, what happens to docility? The chapter has looked at these factors as affecting the main conditions of docility to emerge (i.e. individual being part of a

community, following set standards to exchange information, and ensuring public availability of information).

The answers were explored by using an ABM that expanded Simon's model of docility by including new aspects to it. Different types of docility were defined through new attributes which represent the concept closer to reality. The findings from the simulation and t-tests highlight the importance of organizational support for emergence of docility. It is suggested that organizations should encourage flow of information through cooperation across hierarchical boundaries through informal interactions which will allow social distribution of cognitive resources through docility. Similarly, organizations should encourage its employees to cooperate with each other, so docility can emerge, by eliminating cost on seeking information from others and putting minimum costs on sharing information. Another organizational factor which can help the emergence of docility is the provision of a social environment where employees can interact frequently with each other to exchange information to assist completion of their cognitive tasks. Conversely, when organization restrict the fundamentals of docility by imposing high costs on seeking and sharing information and restrict the range of interactions, non-docile behaviour will prevail and dominate in the organization.

Chapter 6. General discussion and conclusion.

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This chapter discusses the implications of all the findings for academics and management practitioners. I have provided a brief summary of the whole thesis followed by implications based on those findings. The chapter provides ideas for future research in the field.

6.1 Summary of findings.

The overall aim of this thesis was to understand how certain individual attitudes and organizational factors influence individual's behaviour at work. Specifically, I wanted to understand the concept of docility and relate it to other individual and organizational factors through empirical studies. Firstly, I looked at the influence of docility on the relationship between personality and individual's feedback-seeking. Previous studies have shown that personality traits determine individual's feedback-seeking behaviour (Anseel et al. 2015; Ashford 1993; Krasman 2010; Tidwell and Sias 2005). There was limited but interesting evidence which guided this study which allowed exploring role of docility as a moderator of the relationship between personality and feedback-seeking. The study presents the first ever measurement of concept of docility. Secondly, I looked at different organizational factors which played a vital role in emergence of docility.

The findings of this thesis contribute to the feedback-seeking and docility literature by highlighting the psychological, social and cognitive side of the feedback-seeking process. The following discussion is organized by research questions amongst the chapters.

6.1.1 Does docility influence the relationship between FSB and individual personality traits?

The theoretical framework presented in chapter 2 deduced that docility could moderate the relationship between personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) and feedback-seeking behaviour (FSB). The theoretical framework serves as a guideline for the first ever survey based empirical study in the field of docility. The empirical study is presented in chapter

4. To test the framework, data was collected through questionnaire using scales of FSB, Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and OTE) and a newly developed scale of docility. I have conducted exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to explore how the variables of each scale were related and grouped. This was deemed necessary for the scales of FSB and docility as both are newly developed as well as originally tested on some varied but limited datasets. The details of factor analysis are provided in chapter 4. The result of the factor analysis of docility scale showed that docility can be measured through four components namely; Role of Knowledge (ROK), Socially Distributed Decision-making (SD_DM), Sociability and Learning Environment (SLE), and Responsibility Liability and Community (RLC). Similarly, result of the factor analysis of FSB scale showed four components, namely; Direct feedback-seeking from supervisors, Direct feedback-seeking from co-workers, Indirect feedback-seeking from supervisor and co-workers, Reflective appraisal from supervisors and co-workers. The Big Five Inventory used for testing personality traits was a well-established scale and used in a multitude of studies. Therefore, it was decided to not run an EFA as scale was reported to possess adequate internal consistencies. The verified scales were applied to single empirical study to test the framework.

The empirical analysis showed evidence that extraversion had a positive effect on direct feedback-seeking from supervisor along with the rest of the feedback-seeking dimensions. This is in line with previous studies and proposed framework. When examining how docility would affect this relationship, there was evidence that the relation was negatively moderated by high levels of docility. Docility encourages extravert's desire of social interactions, however high level of docility leans on interacting with social channels for a purpose to improve their cognitive abilities and to provide useful information to others. Whereas, highly extraverts motive behind social interactions is to

highlight themselves which may restrict use of socially exchanged information. Hence, high docility will weaken the positive relationship between extraversion and choice of direct feedback-seeking from supervisors. Findings support the theoretical characteristics of highly docile behaviour (excessively relies on socially obtained information for decision-making, Secchi 2011; Simon 1993).

Similarly, agreeableness had positive influence on direct feedback-seeking from co-workers and reflective appraisal from supervisors and co-workers. These findings were in contrast with previous studies (e.g., Krasman 2010) where no influence of agreeableness was found on any of the feedback-seeking strategies. The study couldn't find any effect of agreeableness on direct feedback-seeking from supervisor. Individual's docility did not strengthen the relationship between agreeableness and direct feedback-seeking from supervisor. Interestingly, there was a positive conditional effect of agreeableness on reflective appraisal at moderate to very high levels of docility. This implies that the agreeable highly docile have developed more trust in their supervisors and co-workers in terms of cognition and their abilities that they prefer to use observational methods to seek feedback.

In contrast to previous studies (e.g., Ashford 1993; Krasman 2010; Tidwell and Sias 2005), this research found conscientiousness to have negative influence on the inquiry methods of feedback-seeking. Results showed insignificant negative influence of conscientiousness on direct feedback-seeking from supervisors. However, docility plays a significant role in weakening the insignificant negative influence of high conscientiousness on direct feedback-seeking. This implied that high level of docility tends to encourage highly conscientious to seek feedback from direct methods of inquiry from supervisors instead of avoiding straightforward questions and receiving explicit feedback publicly. Conscientiousness significantly and negatively affected indirect inquiry from supervisors and co-workers. This implied that conscientious individuals do

not prefer roundabout questions or use hints to ask about feedback from others. When docility was examined as a moderator, the interaction weakened the relationship significantly. The findings support theoretical characteristics of docility.

Individual's neuroticism (low emotionality) was expected to make individuals choose observational methods as they allowed avoiding social interactions and gaining information without letting the source know about them being sought for feedback (Wanberg and Kammeyer-Mueller 2000). The study found evidence of neuroticism positively but insignificantly affecting the reflective appraisal from supervisors and co-workers. Very low to low docility (i.e. non-docile behaviour) was found to be restricting highly neurotic individuals to seek feedback from any social channels. Hence, docility (non-docile behaviour) is shown to significantly weaken the positive relationship, this supports theoretical characteristics of non-docile attitude (prefers not to interact with social channels for exchange of information, is self-sufficient, and does not understand significance of use of socially available information to make decisions) towards the social system.

The study showed evidence that individual's high openness to experience (OTE) had a positive and significant effect on reflective appraisal from supervisor and co-workers. The results mirrored Tidwell and Sias (2005) as their study found a positive relationship between openness and covert methods of seeking performance feedback. When examining moderation effect, there was a significant but negative interaction effect of OTE and docility (very low to high levels of docility) on reflective appraisal from supervisors and co-workers. The findings were in line with the theoretical characteristics of non-docile behaviour and highly docile behaviour. It is found that low levels of docility (non-docile behaviour) discouraged use of any socially obtained information (SOI) as feedback which could assist in decision-making or completion of any cognitive tasks. It weakened the relationship between OTE and reflective appraisal from supervisors and

co-workers. Likewise, high docility relies on active exchange of high quantity and good quality of information with social channels (Secchi 2011). The highly docile behaviour of an open individual looked for social interactions which offered extra value; through facial gestures, body language etc. to the information instead of passively sought feedback through concealed ways. Therefore, the low and high docility both weakened the positive effect of high OTE on reflective appraisal from supervisor and co-workers.

The components of docility are shown to be positively related to components of FSB (the strategies) except socially distributed decision-making (SD_DM) is not related to any strategy of FSB. The findings provide meaningful theoretical contributions to the literature on FSB, docility and personality. I have presented theoretical characteristics of individuals showing four different levels of docility. The research supports theoretical characteristics of individual's non-docile, below average, average, and above average docile attitude towards the social system.

6.1.2 Do different organizational attributes (formal and informal organizational structure, cost of seeking information, cost of sharing information, range of interaction) influence emergence of different types of docility?

The second study (presented in chapter 5) is conducted through using agent-based modelling and is focused to look at the effect of organizational characteristics including formal and informal rules of interaction, costs imposed on seeking and sharing information, and range of interaction on emergence of individual docility. The chapter has looked at these factors as affecting the basic pre-conditions of docility to emerge (i.e. individual being part of a community, following set standards to exchange information, and ensuring public availability of information). Four types of docility were defined through new attributes which represent the concept closer to reality. The answers were explored by using an agent-based modelling (ABM developed in Netlogo 5.2) that expanded Simon's model of docility by including new aspects to it. Agents in the model

represent employees with different levels of docility working in an organization. A series of experiments were performed to test the model and the results are confirmed through t-tests in R-Studio.

A series of plots and t-tests have confirmed that the changes in organizational factors under study except organizational structure (formal and informal rules of interaction) significantly bring changes in the numbers of different types of agents depicting their emergence and survival or their decline. Results highlight that when costs are imposed, no matter what the range is, the non-docile behaviour is dominant and prevails in both of the formal and informal scenarios. The other types of docile individuals (including *bd*, *ad* and *hd*) never increase in numbers due to the high cost of seeking and sharing information, The docile population in the organization falls low in number that indicates most of them preferred to imitate non-docile behaviour and switched to *nd*. It is worth noting that the cost of seeking and sharing information both are particularly powerful for *nds* in that it has a strong impact in the spread of the attitude to the other types of individuals. In contrast, when there are no costs imposed on seeking and sharing information and individuals are provided with high range of interactions, the average docile behaviour (*ad*) overcomes the non-docile behaviour (*nd*).

From the above findings, it can be stated that *nd* individuals tend to increase and fit in an organizational environment when information-seeking, and sharing is discouraged by imposing high costs. The *nd* individuals benefit from these conditions and tend to increase.

Results of the simulation show that the organizational characteristics ─ cost of seeking information, cost of sharing information and range of interactions ─ significantly affect emergence of different types of docility and cause variation in their numbers. The hierarchical structure did not influence the numbers significantly. Hence, it can be concluded that the rules of interaction, both in formal and informal structures, do not play

a significant role in causing variation in numbers of agents. Previous studies isolated these elements (e.g., Simon 1993; Knudsen 2003; Secchi and Bardone 2009), whereas this chapter through ABM has uncovered their importance and influence on different types of docility. The results must be further substantiated with more testing with larger group of parameters and additional conditions. Nevertheless, findings from these results indicate that docility prevails when the organizations i) impose no cost of seeking information, ii) apply no cost of sharing information, and iii) provide higher range of interactions. Under such conditions, organizations motivate passively docile to access and utilize publicly available information and encourage actively docile to create and share new social sources of information. Subsequently allowing free flow of information among employees encouraging cooperation and use of socially exchanged information for decision-making. All these conditions are in favour of docility to emerge. As expected and noted above it is the *ad* (average docile) behaviour which adapts well in such a situation.

Remember *ad* shows both active (provides good quality of information) and passive (takes good quality of information) docile behaviour, however the quality of information they have is relatively lower than highly docile (*hd)* individuals. Therefore, the burden of paying costs make *hd* (who shares high quality of information and must pay more) to switch to *ad* and they fit better by showing very significant variation and increase in numbers. There are *non-docile* (*nd*) individuals who take advantage of free riding in similar situations but tend to decrease in number due to the popularity of active docility. Unfortunately, these conditions do not allow highly docile behaviour to influence others in the surrounding, resulting in slight decrease in numbers. The selfish docile *(bd)* tends to increase very slowly in numbers, again due to the popularity of active docility.

When organization applies i) rules of social interactions, ii) imposes high costs on seeking and sharing information, and iii) limits range of interactions; it is restricting flow of

information among individuals discouraging passively docile to access and use publicly available information and discouraging actively docile to create new social sources of information. Subsequently, such limitations discourage individuals to cooperate and exchange information through social channels which can obstruct successful completion of their cognitive tasks. The organization tends to fail the purpose of brining individuals to work in a shared community to achieve one goal. Such an environment is not suitable for docility to emerge and faces failure. Therefore, individuals adapt to the environment and become non-docile as this is the cognitive behaviour which suits the social environmental conditions of the organization. As mentioned above, non-docile does not rely on information exchanged through or with social channels, hence they hardly interact with social channels and avoid paying any costs. To survive, individuals change their attitude towards social environment, if it is too expensive to cooperate with others then instead of altruism people become self-centred and think of their survival only. Conditions like these discourage information exchange and cooperation within teams/departments/divisions in carrying out daily tasks. Such restrictions make individuals bound their cognitive activities and abilities to limited number of resources. Instead of delegating their cognitive tasks to others, they tend to perform their own activities with limited cognitive abilities and resources which may affect their quality of work and performance. In short, docility does not prosper in both formal and informal scenarios, when cost of seeking and sharing is high and contribution to fitness is negative. It is the non-docile who benefits from these conditions and tend to increase in number by successful adaptation.

The passive docility of below average docile (*bd)* has helped them to survive, although with very low numbers in different conditions, however, the most favourable condition so far is regardless of type of rules of interaction, when organization imposes i) highest cost of seeking, ii) lowest to highest cost of sharing information, and iii) low to medium

range of interactions. The findings are in contrast with Simon's view on elimination of selfish in a docile community and are consistent with Secchi and Bardone (2009) that selfish survive in small numbers in a docile community. The highest cost of seeking discourages docile to seek information from others, however the selfish free rides and does not let the information provider know that he/she has been sought for information. The less they interact, the better they fit in the system and survive. The number of *bd* tends to fall very low, sometimes closer to ten, when organizations encourage seeking information by not imposing any costs and range of interactions is set to highest value. The reason lies in the successful adaptation of other docile types (like *ad*) who rely extensively on seeking and sharing information while interacting within maximum range. In short, study confirms that *bd* individuals tend to survive with low numbers under both formal and informal rules of interaction and high costs imposed by the organization.

Similarly, it is concluded that there is a decrease in *average docile (ad)* numbers when cost of seeking and cost of sharing are high with lowest range of interactions in both formal and informal scenarios. In contrast, the *ad* numbers increase when there are no costs imposed and range is highest in informal organizations. Results confirms that when costs are imposed, no matter what the range of interaction is, the *non-docile* behaviour prevails. In contrast when there are no costs imposed on seeking and sharing information and individuals are provided with high range of interactions, the docile behaviour (*ad)* overcomes the *non-docile* behaviour.

In short, individuals' non-docile behaviour dominates when their organization imposes i) high cost of seeking information, ii) high cost of sharing information, and iii) reduces range of interactions. In contrast, when the organization encourages individuals to exchange information freely and does not impose any costs the docile behaviour prevails. The factors under study are extremely significant in understanding how different types of docility emerge and become prevalent cognitive attitude within formal and informal

organizations. These conditions allow docility to emerge as encouraging employees to seek and share information means giving a *public dimension* to social information sources. The conditions create an environment of a *community* who work to achieve same goal through cooperation which allow docility to emerge. In addition, imposing low costs on sharing information motivates actively docile to be able to create more and willingly share that resource with others. The low cost of sharing also enables docile individuals to follow set *standards of sharing information* which makes the knowledge transfer much easier (standard-fidelity; Bardone et al. 2006). Similarly, allowing individuals to interact freely and within maximum range gives the opportunity to the actively docile to create and socially distribute cognitive resources within the organization. Results from the simulation provide support to the claims by Secchi (2016) that docility prevails when there are limited costs for prosocial behaviours and there are high range of interactions. The simulation model has been entirely developed on theoretical assumptions and it needs to be tested empirically. The following implications are based on the results of both studies.

6.2 Implications.

The research highlights few aspects that seem relevant for management scholars and practitioners. First, it puts feedback-seeking in a more current perspective by connecting it to more up-to-date perspectives in cognitive science, on the one hand, and to social interactions on the other. Second, consistently with the literature, it connects the psychology of personality with FSB with a clear focus on decision-making. Third, by specifying the psychology of FSB it also contributes to specify how docility plays a significant role in analysing social interactions. Fourthly, it validates the scale to measure the concept of docility for the first time ever increasing the significance of this study. Finally, it uncovers the organizational factors which significantly assist docility to emerge and become a prevalent cognitive attitude. The research is clearly leaning towards cross-

disciplinary research. In fact, it can be used by researchers in the fields of cognition, organizational behaviour, psychology, and computer simulation.

6.2.1 Perspectives on feedback-seeking and docility.

One of the most important outcomes of the framework presented in chapter 2 is, perhaps, its contribution towards a more fine-grained understanding of feedback-seeking behaviour (FSB). As a specific behaviour that is directed towards informal proactive search, it has a psychological, a social, and a cognitive side. Attention from the literature so far has been mostly directed towards the last aspect (i.e., the cognitive) and, as shown above, to the first, the psychological (Alicke and Sedikides 2009; Krasman 2010; Tidwell and Sias 2005). The social dimension that becomes apparent in our framework contributes to shed new light on FSB.

On the one hand, the social dimension of docility brings in the dynamics of interaction and highlights the *behavioural* side of FSB. This element is crucial in that it considers the complexity of behaviour. This means that successful seeking behaviour can also be an emergent aspect of FSB that is less tied to a strict logic of specific search strategy. In short, our framework contributes to see seeking behaviour more as working on an appropriateness rather than only on a consequential logic (March 1994).

On the other hand, docility is grounded on a distributed cognition perspective (Hutchins 1995; Secchi 2011). As such, it sees cognition as not just computation or, in our case, exchange of information. Instead, it situates that 'information' in a specific source (e.g., another human being) with a history, a culture, some norms, that affect the way the information passes through social channels. This means that the content/meaning of 'information' varies significantly as it depends on the dynamic of the social relation (i.e., interactivity; Steffensen and Pedersen 2014) more than the more or less objectified piece of 'data.' Hence, the framework goes in the direction of explaining why and how to read feedback-seeking as a social and cognitive behaviour.

In addition to what is written in chapter 1, 2 and 4, my discussion of docility as it relates to the distributed cognition approach can be thought of as revealing the social side of bounded rationality (BR), something that has been advocated by others elsewhere (Gilbert and Conte 1995). This has potentials to lead to a thorough understanding of employees' interactions with organizational resources (social and non-social). Both perspectives of distributed cognition approach (i.e., *inside out* and *outside in*) can assist in understanding employees' behaviour of distributing cognitive activities to the social system. In this context, docility acts as an interface which defines the degree employees are prone to the use of available social resources. The variation in docility levels among employees specifies differences in cognition which are subject to various organizational constraints that enable or disable cognitive processes. By measuring docility of a worker, then finding ways to 'expand' (Secchi 2011) cognition becomes one of the major challenges and objectives for management.

The distributed cognition mechanisms offer an important framework to managers through which they could understand how to develop individual employees' cognitive potentials (Hutchins 1995). Access to state-of-the-art technological devices for information sharing becomes important for the survival of organizations as these tools adjust flexibly to different cognitive needs. For example, organizations that introduce dedicated chat lines, high speed intranet for internal communication, or information transfer, conference calls are actually supporting the docile disposition of those employees who have multiple options to access social channels. Under the theoretical assumptions leading to the framework, we claim that employee docility should be taken into consideration to ease communication flows (facilitating feedback-seeking behaviour), and to make individuals exchange feedback more efficiently.

Hence, management scholars have the opportunity to investigate decision-making under the perspectives offered by docility in bridging the psychological with the cognitive with

a clear behavioural outcome (i.e., FSB in this study).

6.2.2 Individual factors.

This research is the first attempt to study the psychological side of docility and its influence on the social side of information-seeking for having feedback regarding work performance. It has presented the cognitive link between psychological and behavioural aspects of feedback seekers through docility. The theory reviewed in the thesis (e.g., Clark and Chalmers 1998; Hutchins 1995; Magnani 2007; Simon 1993) suggests that docility, along with personality traits, can contribute to explain why individuals rely on interacting with the environment and with resources in the social system while seeking performance related feedback information for decision-making. Similarly, it suggests that docility and personality traits can contribute to explain why individual's FSB differs even when resources and environment remains the same. The conceptual model has provided opportunity towards analysing the effects of docility empirically in chapter 4.

6.2.2.1 Mechanisms to promote individual's FSB and docility.

Knowing that FSB is a vital resource of improving employee's performance, decreasing turnover intentions, increasing OCB and job satisfaction (see reviews by Anseel et al. 2015; Ashford et al. 2003), it is important to understand the psychological or cognitive factors which relate to it in order to identify ways of encouraging and promoting it in the workplace. Findings from the research give clear directions to managers and supervisors that individual personality relates to FSB and that the relation is moderated by individual docility. Everyone has a different approach towards seeking feedback. My study gives some knowledge to manager/supervisors about the influence of individual's personality on their preference of certain strategies of seeking feedback. This will indicate the practitioners (managers/supervisors) regarding the availability of resources and methods to provide information to the feedback seekers. My study emphasizes on the fact of one

size won't fit all, as one has to adapt to feedback seekers' preferences in order to encourage and promote FSB.

It is recommended to develop various communication tools (Brutus and Greguras 2008) which ensure employee's privacy and promote increasing feedback-seeking frequency especially for employees who incline towards seeking private as well as explicit feedback. Organizations can also organize supervisory trainings with the focus of making them learn how to provide feedback to their subordinates using various strategies which meet the subordinates' psychological and behavioural situations.

The explained findings can assist managers/supervisors in understanding the role of docility in strengthening and weakening the relationship between personality traits and feedback-seeking strategies. Knowing the average docile behaviour of employees for specific tasks can predict its influence on individual's choice of FSB. Hence, knowing more about the antecedents of FSB. This will also give opportunity to managers/supervisors to implement mechanisms to promote docility within organizations by introducing formal rules or informal norms which will assist in sustaining the relationships which lead to effective and efficient performance. Organizations also should establish mechanisms in the form of informal norms or formal rules which are focused to avoid the occurrence of relations which lead to ineffective and unproductive decisions. In summary, I suggest that managers should give some attention to understand how distributed cognition works within organizations and how docility influences social interactions aimed for feedback-seeking. Similarly, they have to devote more time to understand how personality plays role in seeking feedback from the social environment.

6.2.3 Organizational factors.

The findings from the simulation show that docility prevails in organizations where there are i) no cost of seeking information, ii) lowest cost of sharing information, and iii) higher range of interactions regardless of formal or informal rules applied by hierarchical

organizational structures. These findings highlight the importance of organizational support for emergence of docility. It is suggested that organizations should encourage its employees to cooperate with each other ensuring flow of information, so docility can emerge. This is possible by not imposing high costs on proactive information-seeking and sharing as well as ensuring provision of social environment where employees are allowed to interact frequently with each other to exchange information, assisting completion of their cognitive tasks. It is evident from the results that whenever the costs were high, there was a blockage of information flow shown by increase in number of below average and non-docile agents. In short, individuals' non-docile behaviour dominates when their organization imposes i) high cost of seeking information, ii) high cost of sharing information, and iii) reduces range of interactions. Whenever organization restricts the fundamentals of docility by imposing high costs and restricting the range of interactions, non-docile behaviour will prevail due to environmental suitability and dominate in the organization causing blockage of information flow creating problems for organization.

The research findings give clear indications to managers/supervisors/organizations to avoid situations or policies which obstruct information flow causing unfavourable conditions for docility. The results also highlight the conditions which are suitable for non-docile behaviour as well as selfish behaviour of a docile to survive within organizational environment. The study provides managers/supervisors/organizations with some knowledge on how to tackle with undesirable situations by manipulating the environment in a way which discourages non-docile behaviour and selfish behaviour of docile. Reducing the costs and increasing the range of interaction can improve docility to emerge and non-docile behaviour as well as the selfish behaviour of docile to decline.

6.3 Conclusion.

This thesis first reviews the literature on concepts under research, particularly focusing on the development of the concept of docility. By doing so, it highlights its cognitive and

behavioural aspects which assisted in presenting it as moderator of the relationship between individual's personality traits (extraversion, agreeableness, conscientiousness, neuroticism and OTE) and their FSB through a conceptual framework. Following the conceptual model, the study explains the research design and choice of research paradigm. Based on the framework, hypotheses are developed for the subsequent empirical study. Before conducting empirical tests, scales used to measure main variables are tested for reliability and validity. The details of factor analysis are also provided. The empirical section provides evidence of personality traits influencing feedback-seeking strategies and docility moderating the relationship between few personality traits and FSB. Detailed discussion on results of the empirical study are presented followed by implication and limitations.

I have theoretically explained the role of organizational factors — formal and informal rules of interaction, costs imposed on seeking and sharing information, and range of interaction— on individual docility within an organizational environment. The theory is supported by findings from the experiments conducted through ABM and additional tests to confirm the significance of the results. The results show that docility prevails in organizations where information is allowed to flow freely, conditions such as i) no cost of seeking information, ii) minimum cost of sharing information, and iii) higher range of interactions allow docility to emerge. On the other hand, if there are i) high cost of seeking information, ii) higher cost of sharing information, and iii) minimum range of interactions, non-docile behaviour dominates the social system restricting flow of information.

The main contributions of this thesis are: i) the study has provided *theoretical explanation* of the *development of the concept of docility* and its *refinement* through detailed literature review, ii) it has contributed to the theory of docility by conducting *first ever empirical study* of *docility* presenting it as a moderator of the relationship

between personality and FSB, iii) the study has ***broadened the scope of the antecedents of FSB*** to understand better how and when this behaviour emerges and how to improve it, iv) the study has presented first empirical study which has used newly developed validated scale to measure docility, v) the study has explained different types of docility based on new attributes, and vi) the simulation-based study identified several ***organizational factors***, including costs associated with seeking and sharing information and the provision of social environment, which when changed showed significant influence on emergence of different types of docility. More specifically, the conditions which allow non-docile behaviour and docile behaviour to be successful and dominate are highlighted.

The research is clearly leaning towards ***cross-disciplinary research***. In fact, it can be used by researchers in the fields of cognition, organizational behaviour, psychology, and computer simulation. This study creates an opportunity to bridge practitioners and academics understanding of docility. Previous studies on docility are mainly based on simulation-based research. Those studies have assisted in developing the theory, but it is challenging for academics to systematically understand docility. The use of scale can be applied to compliment the traditional method practitioners rely on. Hence, it creates a communication channel between practitioners and academics and increases the applications of works in both fields. The following section will highlight the limitations of both the studies as well as give some ideas for future research.

6.4 Limitations and ideas for future research.

There are several limitations concerning the combination of conceptual framework, data collection, social desirability bias and tool to measure FSB.

First, cost of seeking has long been thought to influence feedback-seeking (e.g., Lanzetta 1971; O'Reilly 1982; Anseel et al. 2015). Whereas, the study only used individual

psychological and behavioural variables associated with FSB. The conceptual model has not considered costs affecting choice of feedback-seeking strategies. It is found that decision makers usually use accessible sources rather than the ones providing higher quality information. They show this behaviour because of the cost involved in accessing and seeking out more informative resources (O'Reilly 1982). Although, this limitation is somewhat compensated in the revised model of docility, where the concept of costs involved in seeking and sharing information are studied and analysed through ABM. Future studies could include costs and values that are associated with FSB. Generally, this cost-value analysis is observed as the primary determining factor of subsequent FSB (Anseel et al. 2015). Looking at this relation being influenced by personality and docility can improve the understanding of determinants of FSB.

Second, the model focused on looking at how individual personality traits affect their FSB. The possibility of the contribution of personality towards individual's level of docility is yet to be explored. This is already indicated by Digman (1990) and Secchi and Bardone (2009) that docility can be linked with personality traits. The characteristics of the four types of docility defined in Chapter 5 (non-docile, below-average docile, average docile, and highly docile) can be linked to BiG5 personality traits. The data in this study showed a high correlation between docility and the BiG5 personality traits. All traits except neuroticism are positively and significantly related to docility. Neuroticism has a negative correlation with docility. For example, most of the attributes of extraversion make individuals very open and proactive communicators within a social environment (Weaver 1998) which can influence individual's docility. Similarly, trust, as one of the facets of agreeableness, can influence individual's inclination towards a specific social source (Ossola 2013) and level of dependence on the information coming from that source which defines docility. Neuroticism is found to reduce interpersonal interaction (Wanberg

and Kammeyer-Mueller 2000) which has a negative influence on individual's docility. This deserves further research in future.

Third, there are limitations regarding measurement of FSB. While carrying out EFA of FSB scale, items measuring reflective appraisal from supervisors and co-workers were combined together into a single factor. Similarly, it combined items measuring indirect feedback-seeking from supervisors and co-workers into a single factor. The combination of two sources into a single factor did not allow identification and differentiation between individual's preferences (influenced by their personality traits) for sources to approach for feedback-seeking. The choice of measurement was restricted due to lack of valid measurement scales on FSB.

Fourth, limitation is not explaining individuals' FSB with respect to the complete continuum of personality. Same is true for not analysing the influence of different types of docility (discussed in chapter 5) on the relationship between complete continuum of personality traits and FSB. Future research should endeavour to identify these relationships.

Fifth, limitation is related to excluding role of organizational characteristics on FSB and then analysing this relationship under the lens of different levels of individual docility. Influence of organizational characteristics — organizational culture, size, tenure and structure— on FSB and role of docility in moderating/mediating this relationship. Future research should explore these antecedents of FSB.

Sixth, limitation of the study is using cross-sectional data. If FSB is based on job tenure as the literature presented (e.g. Anseel et al. 2015), there should be a significant change in FSB at the time of starting the job as a newcomer and after few months or years. Thus, longitudinal data could have improved the internal validity and enable the study to make causal claims. Future research can assess causal effects using longitudinal data.

Seventh, data for the survey-based research are self-reported, it is possible that respondents were biased in responding to the questions. It is very important to realize that it would not be possible to gather data on individual's indirect inquiry and reflective appraisal without self-reporting. As these strategies are privately carried out by the feedback seekers, it would not be feasible for others to rate them for the information seekers. Same is true for individual level of docility. Only the individual is aware of their level of dependency on using socially obtained information to complete their cognitive activities and therefore they are the only ones who can rate if they cooperate and feel responsible at work and find significance in information coming from knowledgeable individuals.

Moreover, it would be interesting to explore in detail the relationship between docility and creativity. Creative individuals prefer to diverge from conventional wisdom and embrace new methods of thinking and doing tasks so that they can develop innovative and valuable ideas (Shalley et al. 2009; Zhou and George 2001). This is what extraverts and highly open individuals do and docility seems to influence their relationship with FSB. I would recommend to study docility in relation with other individual characteristics like occupation (e.g., Bennett et al. 2006), age (Williamson and Asla 2009), level of education which are assumed to influence individual's information-seeking. Therefore, the addition of other personality variables is a promising way for future research. Furthermore, it may be very useful to find other fundamentals that may affect docility, with the aim of providing organizations and researchers some more insight into antecedents of docility.

In addition, the sample was limited to individual working in England, which may affect generalizability of the findings to other populations and countries. Therefore, future researchers could increase the sample size and select a more diversified sample from different cultural contexts e.g. European or Asian countries.

This research is a first attempt to study the psychology and cognition of FSB through the lenses of the current distributed approaches to cognition. In so doing, it highlights the importance of docility as a useful connector between social, cognitive, and psychological aspects of decision-making. Further empirical and theoretical research is needed to corroborate these initial conceptual steps.

The main limitation of the study of docility through agent-based simulation is the simulated results always depend, on the one hand, on the values of parameters set by the modeller under which the simulation is performed, and, on the other hand, they rely on each detail of the "internal" structure of the simulation model. Albeit, the simulation mimics the real-world conditions at a crude rather than an abstract level, for the accuracy of the results to be more applicable to a real-world scenario, this technique better be used in conjunction with other methods, such as empirical data to understand and validate the functioning of docility. The simulation model has been entirely developed on theoretical assumptions and it needs to be tested empirically (or validated as few suggest including Fagiolo et al. 2007; Moss 2008). The way ABM can or should be tested or validated is a subject under debate and is not too clear so far; to better specify how to test them is a challenge for future research (Fagiolo et al. 2007). In practice, a simulation is validated based on some objective and not on being a true representation of the real system. All of the methods developed to prove the validity of a simulation in practice are subjective to the evaluator and therefore cannot systematically prove the relative validity of the simulation. As a sort of validating procedure (Edmonds and Moss 2005), ABM is compared with quantitative research that some may call triangulation (Coen 2009). The ABM is built as a result of a quantitative study or, the other way around, data from the study can be used to validate the model (Edmonds and Moss 2005). In case of studying docility, the choice of using ABM was made because of observing interactions which were not feasible with other quantitative research methods. Hence, validation is

compromised when studying docility through simulation.

There are few future research ideas through which the ABM model of docility can be expanded in different ways increasing the granularity in the simulation model of docility. It will be more practical to include procedures which can present promotion and demotion of employees. An agent who stays the fittest among the rest in the hierarchical level for a specific number of steps gets promoted. Where the one with lowest fitness gets demoted. The change in the agent's hierarchical level (e.g. if promoted an increase in the hierarchical level by 1) can implement this process.

It is assumed that non-docile individuals change their jobs frequently (Secchi and Bardone 2009). If agent is being non-docile for specific number of steps, a procedure can handle this situation by killing the agent to depict quitting a job. Similarly, a procedure of hiring can also bring the model closer to reality. Increase in number of agents in a particular hierarchical level, specifically from where the agents have left can also improve the model.

Procedure to calculate number of linked agents with highly docile, having highest quality of information, will give an insight into importance of presence of experts in teams. Practical definition of costs of seeking information and sharing are yet to be explored.

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Appendix 1. Contribution in the field of Docility after Simon, (1990, 1993)

Authors	Objective	Approach to docility and contribution	Methodology	Outcome
Johnson et. al (1992)	- To compare Simon's docility with Trivers' (1971, 1985) reciprocal altruism. -Altruistic behaviour towards non-kin	Tendency to believe what they perceive others in the society want them to learn and believe	Review of studies of correlates of human altruism Johnson et. al (1987,1988,1989)	Favour reciprocal altruism over docility as an explanation of altruistic behaviour directed toward non-kin
Bruderer and Singh (1996)	-To demonstrate theoretically that organizational learning guides environmental selection in a Darwinian framework of evolution	Relates it with specific learning capabilities	Computational Model to build theory.	Org. Evolution Process: 1-Variation 2- Org. Learning (adaptation) 3- Selection Theoretical findings are consistent with empirical findings.
Knudsen (2003)	-To review Simon's explanation of altruism.	Capacity for being instructed through social channels Tendency to accept and believe	Integrated Simons theory of altruism to Hamilton's (1964,1975) theory of kinship selection and structured population	-Hamilton's model supports Simon's theory of altruism. -Simon's model is applicable to both economic and biology.
Secchi (2007)	To modify model of human interaction (Simon, 1990, 1993) using concepts of altruism, selfishness and docility.	Docility as a character which pertains to the individual and implies altruism in the society.	Game theory simulation matched Robert Frank (1994) Hawks and Doves model with Simon's docility model of evolutionary change	Docility effects every society member and is a basis of social interaction along with altruism, concept of "survival of the fittest" is rejected, and the model shows that selfish do not die.
Secchi and Bardone (2009)	- To redefine concept of docility - Find the percentage of super docile needed in orgs to reach an equilibrium state	A kind of adaptation that facilitates the process of distributing human cognitive functions to the environment, and makes that a major basis for decision-making	Game theory simulation matched Robert Frank (1994) Hawks and Doves model with Simon's docility model of evolutionary change	-Re-defined docility as an active attitude -Docility can be used in defining and analysing human behaviour in organizations. - Below 20% super docile are needed in orgs to reach an equilibrium

Authors	Objective	Approach to docility and contribution	Methodology	Outcome
Secchi (2009)	Presents how distributed cognition approach provides a viable explanation for social responsibility (SR) in human thinking	Explains the connection between cognitive capabilities and prosocial behaviour through docility (active and passive attitude)	Theory development to relate SR to cognitive science	SR allows individuals to maintain cognitive advantages and emerges when the same social channel is exploited for extended periods of time.
Miller and Lin (2010)	-To study how different epistemologies, affect organizational learning processes.	Used Simon's (1990) and Knudsen's (2003) view on docility as a background assumption for their agent-based model of interpersonal learning.	Contributes to theory development through agent-based modelling	Pragmatists learn effectively in a controlled organizational environment whereas coherentists and conformists advance in knowledge only to the extent that they can control the environment.
Bardone and Magnani (2010)	-To consider and investigate fallacies	A kind of attitude or disposition to facilitate exploitation of eco-cognitive and eco-logical resources - Actively engaged in providing and sharing resources	Agent based framework on logic (Gabbay and Woods 2001, 2005; Woods 2004, 2007)	-Human rely on fallacious arguments as they want to make use of eco-cognitive and eco-logical resources delivered through cognitive functions -can influence the way human cognition evolves and function.
Secchi (2011)	Understanding decision-making in organizations	Presented theory of docility as a way to better understanding organizational dynamics by utilizing extendable rationality and the distributed cognition approach	Theory development by merging different concepts and models.	Theory of extendable rationality based on the distributed cognitive approach and docility-the key components of decision-making process in organizations.
Ossalo (2013)	Determinants of docile behaviour within and between organizations	Same as Simon (1993) and Secchi and Bardone (2009)	Theoretical framework	Trust and trustworthiness through confidence, positively influence docility

Authors	Objective	Approach to docility and contribution	Methodology	Outcome
Secchi and Bardone (2013)	To find which organizational variables reduce or increase the emergence of bandwagons	"the willingness to be taught" The average attitude that individuals have to exchange information with other individuals, and to make decisions on the basis of that information.	Mathematical Modelling to build up theory Numerical analysis and simulation.	-Likely to decrease to a functional and workable level with higher levels of docility
Secchi (2016)	To find the boundary conditions under which organizations facilitate the emergence of docility	Same as Secchi and Bardone (2009; 2013)	Agent based modelling by using Simon's (1993) model of docility.	docility prevails when - there is low cost of prosocial behaviour - informal or flexible environment allowing maximum interactions
McMillan (2016a)	To address the core concept of docility in Simon's learning Theories and explain docility as a missing link in organizational performance structures.	Same as Simon (1976, 1993), docility is teachability or instructability and how individuals learn from SC for information and advice for decision choices.	Literature review	Docility is a tool to link individual learning with organizational learning in complex environments and changing technologies.
McMillan(2016b)	To address the nature of docility in organizations, its practical role in attention scarcity and knowledge diffusion in complex organizations.	Same as Simon (1976, 1993).	Theory development	This paper addresses the shortage of studies linking the need for docility in personnel practices of knowledge firms, where intense social interaction, social feedback and social learning are the norms.
Thomsen (2016)	To explore how composition of teams with respect to team members' level of docility impacted teams' ability to coordinate by mutual adjustment.	As an individuals' capacity to accept instructions and the tendency to accept and believe instructions received through social channels (Simon, 1997).	Agent based modelling	Teams with average levels of docility in the mid-range territory are better coordinators than teams with too low or too high level of docility.

Authors	Objective	Approach to docility and contribution	Methodology	Outcome
Bardone and Secchi (2017)	Redefine bounded rationality based on more socialized view of the individual.	Upgraded concept of docility through inquisitiveness which allows docile individual to learn by inquiry and open explorations of their environment discounting any set boundaries.	Agent based modelling	Discounting any boundaries allows individuals to be inquisitive in presence of many problems in their environment. This inquisitiveness works as efficiency driver that economizes on knowledge needed by team members to solve problems.

Appendix 2: Research Questionnaire for Empirical Study

BOURNEMOUTH UNIVERSITY

BUSINESS SCHOOL, FACULTY OF MANAGEMENT

MIND YOU MIND: SOCIAL INFLUENCE ON INDIVIDUAL DECISION-MAKING

You are being invited to participate in a research study on organisational behaviour funded by Bournemouth University. The research looks at an underexplored concept of human 'docility' which defines individual's tendency to lean on suggestions, recommendations, persuasion, advice, and information coming from others in order to make decisions. Data collected through this survey will help the research to identify and explain relationships between docility and other individual psychological and cognitive characteristics which can influence individual decision-making.

Based on previous trail runs, it is estimated that the questionnaire takes 15 minutes to complete. It is at your discretion to take part in this survey. You can withdraw from the study at any time by closing the browser page. However, once you have completed and submitted the questionnaire we are not able to remove your anonymized response from the study. By completing this questionnaire, you are consenting to take part in this study. We ensure you of your anonymity and confidentiality throughout the research. There are no right or wrong answers, so please answer the questions as honestly as possible.

The analysis from the research seem very promising in the field of individual decision-making. If you are interested in the results, have questions, suggestions, or comments, please feel free to email Mehwish Mufti at mmufti@bournemouth.ac.uk. In case of any complaint, please email Bournemouth University's research governance on researchgovernance@bournemouth.ac.uk. Your participation is very much appreciated, thank you very much for your cooperation.

Section 1: This section gathers demographic information of the respondents and their work.

Please indicate your nationality.

- ○   British
- ○   European (not British)
- ○   USA
- ○   Other

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What is your employment status?

- ○   I currently work full time
- ○   I currently work part time
- ○   I am currently unemployed
- ○   I am currently self-employed

When at work you normally work....

- ○   alone
- ○   in teams of 2 members
- ○   in teams of 3 members
- ○   in teams of 4 members
- ○   in teams of 5 members
- ○   in teams larger than 5 members

Do you have a supervisor/line manager at work?

- ○   Yes
- ○   No

With what gender do you associate yourself?

- ○   Male
- ○   Female
- ○   Prefer not to tell

What is your age (in years)?

- ○   _____

What is your marital status?

- ○   Single
- ○   Married
- ○   Divorced
- ○   Separated
- ○   Widowed
- ○   Living together
- ○   Prefer not to tell

What is the highest level of education you have completed?

- ○   Grammar school
- ○   High school or equivalent
- ○   Vocational/technical school
- ○   Some college
- ○   Bachelor's degree
- ○   Master's degree
- ○   Doctoral degree
- ○   Professional degree (MD, JD, etc.)
- ○   Other

How long is your work experience (in years) independent from your current employer?

_____

How long have you been with the organization that currently employs you?

- ○ Less than 6 months
- ○ between 6 months and up to 1 year
- ○ between 1 and up to 3 years
- ○ between 3 and up to 5 years
- ○ More than 5 years

Which sector do you currently work in?

- ○ Public sector (e.g. Government hospital)
- ○ Private sector (e.g. Private company)
- ○ Not for Profit (e.g. Charity organization)

Which of the following most closely describes your position here?

- ○ Entry level
- ○ mid-ranked employee
- ○ Middle Manager
- ○ Senior Manager

Does your role include supervisory responsibilities?

- ○ Yes
- ○ No
- ○

Section 2:

Following questions are aimed to assess your personal behavioural preferences, that is, how you like to work. They are not concerned with your abilities, but how you see yourself in the way you relate to others, your approach to problems, and how you deal with feelings and emotions. There are no right or wrong answers. The characteristics mentioned below may or may not apply to you.

Please indicate to the following items the extent to which you agree or disagree with that statement.

I see myself as someone who....	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
is talkative.	○	○	○	○	○
is reserved.	○	○	○	○	○
is full of energy.	○	○	○	○	○
generates a lot of enthusiasm.	○	○	○	○	○
tends to be quiet.	○	○	○	○	○
has an assertive personality.	○	○	○	○	○
is sometimes shy, inhibited.	○	○	○	○	○
is outgoing, sociable.	○	○	○	○	○
tends to find fault with others.	○	○	○	○	○
is helpful and unselfish with others.	○	○	○	○	○
starts quarrel with others.	○	○	○	○	○
has a forgiving nature.	○	○	○	○	○
is generally trusting.	○	○	○	○	○
can be cold and aloof.	○	○	○	○	○
is considerate and kind to almost everyone.	○	○	○	○	○
is sometimes rude to others.	○	○	○	○	○
likes to cooperate with others.	○	○	○	○	○
does a thorough job.	○	○	○	○	○

can be somewhat careless.	○	○	○	○	○
is a reliable worker.	○	○	○	○	○
tends to be disorganized.	○	○	○	○	○
tends to be lazy.	○	○	○	○	○
perseveres until the task is finished.	○	○	○	○	○
does things efficiently.	○	○	○	○	○
makes plans and follows through with them.	○	○	○	○	○
is easily distracted.	○	○	○	○	○

Please indicate to the following items the extent to which you agree or disagree with that statement.

I am a sort of person who	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
is depressed, blue.	○	○	○	○	○
is relaxed, handles stress well.	○	○	○	○	○
can be tense.	○	○	○	○	○
worries a lot.	○	○	○	○	○
is emotionally stable, not easily upset.	○	○	○	○	○
can be moody.	○	○	○	○	○
remains calm in tense situations.	○	○	○	○	○
gets nervous easily.	○	○	○	○	○
is original, comes up with new ideas.	○	○	○	○	○
is curious about many different things.	○	○	○	○	○
is ingenious, a deep thinker.	○	○	○	○	○
has an active imagination.	○	○	○	○	○
is inventive.	○	○	○	○	○
values artistic, aesthetic experiences.	○	○	○	○	○
prefers work that is routine.	○	○	○	○	○
likes to reflect, play with ideas.	○	○	○	○	○
has few artistic interests.	○	○	○	○	○

| is sophisticated in art, music, or literature. | ○ | ○ | ○ | ○ | ○ |

Section 3:

The following questions are designed to analyse your tendency to exchange information with other individuals at work.

Please indicate your level of agreement or disagreement to the following statements considering yourself as part of a team.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I believe that knowledge plays an important role when taking advice. (RK_1)	○	○	○	○	○
I lean towards knowledgeable individuals when taking advice. (RK_2)	○	○	○	○	○
I listen to more than one opinion when making tough decisions. (RK_3)	○	○	○	○	○
In our team/department/division, we learn from each other very often. (SLE_1)	○	○	○	○	○
Our team/department/division, uses cooperation to accomplish daily tasks. (SLE_2)	○	○	○	○	○
On this item please click "strongly disagree" (Quality Check)	○	○	○	○	○
I feel responsible to the team/department/division for what I do in my job. (RLC_2)	○	○	○	○	○
I feel good when I meet with other people at work. (RLC_3)	○	○	○	○	○
I often spend time to understand other people concerns, problems, or else. (RLC_4)	○	○	○	○	○
I make people feel comfortable when at work. (SDDM_1)	○	○	○	○	○
People come to me to help solve problems. (SDDM_2)	○	○	○	○	○
I usually help people to make decisions. (SDDM_3)	○	○	○	○	○
I always share information with other people at work. (ISH_1)	○	○	○	○	○
Many people enjoy sharing information with me. (ISH_2)	○	○	○	○	○
In my team/department/division, we always discuss goals and objectives. (RLC_1)	○	○	○	○	○

250

Section 4:

The following sections relate to your feedback-seeking from supervisors and co-workers keeping in mind your work outcome and the methods used to perform task. Think about the last three months at work. In order to determine whether the **results of your work** are correct, how often do you

	Very infrequently	Rarely	Occasionally	Frequently	Very frequently
Ask your supervisor directly? (OFS_1)	○	○	○	○	○
Ask your supervisor indirectly (e.g. by using hinting, joking, roundabout questions)? (OFS_2)	○	○	○	○	○
Pay attention to how your supervisor treats you? (OFS_3)	○	○	○	○	○

Think about the last three months at work. In order to determine whether the **methods you are using** to carry out your work are correct, how often do you

	Very infrequently	Rarely	Occasionally	Frequently	Very frequently
Ask your supervisor directly? (PFS_1)	○	○	○	○	○
Ask your supervisor indirectly (e.g. by using hinting, joking, roundabout questions)? (PFS_2)	○	○	○	○	○
Pay attention to how your supervisor treats you? (PFS_3)	○	○	○	○	○

Think about the last three months at work. In order to determine whether the **results of your work** are correct, how often do you

	Very infrequently	Rarely	Occasionally	Frequently	Very frequently
Ask your co-workers directly? (OFC_1)	○	○	○	○	○
Ask your co-workers indirectly (e.g. by using hinting, joking, roundabout questions)? (OFC_2)	○	○	○	○	○
Pay attention to how your co-workers treat you? (OFC_3)	○	○	○	○	○

Think about the last three months at work. In order to determine whether the **methods you are using** to carry out your work are correct, how often do you

	Very infrequently	Rarely	Occasionally	Frequently	Very frequently
Ask your co-workers directly? (PFC_1)	○	○	○	○	○
Ask your co-workers indirectly (e.g. by using hinting, joking, roundabout questions)? (PFC_2)	○	○	○	○	○
Pay attention to how your co-workers treat you? (PFC_3)	○	○	○	○	○

Appendix 3: Exploratory Factor Analysis of items measuring docility Secchi (2017a).

		Factors				
Pattern Matrix[a]						
		1	**2**	**3**	**4**	**5**
Sociability Learning Environment	DSLE1	.51				
	DSLE2	.92				
Responsibility, Liability and Community	DRLC1		.53			
	DRLC2		.42			
	DRLC3		.53			
	DRLC4		.65			
Socially Distributed Decision-making	DSDDM1			.41		
	DSDDM2			.50		
	DSDDM3			.80		
Role of Knowledge	ROK1				.70	
	ROK2				.51	
	ROK3				.41	
Information Sharing	ISH1					.45
	ISH2					.94

a. *Extraction Method: Maximum Likelihood.*
   Rotation Method: Varimax.
b. *Rotation converged in 5 iterations.*
Loadings lower than 0.40 were omitted.
DSLE= Sociability and learning environment, DRLC= Responsibility liability and community, DSDDM= Socially distributed decision-making, ROK=Role of knowledge, and ISH = Information sharing.

Note: The purpose of showing this EFA is to compare the results of the factor loadings of Secchi (2017a) and my study. In Secchi (2017a) there were five factors and total of 14 items. Whereas, in my study items measuring information sharing (DISH1 and DISH2) needed to be eliminated due to low and cross loadings as well as low reliability.

Appendix 4: Code of ABM in Netlogo 5.2.1

```
globals [ #n-docile #b-docile #a-docile #h-docile ]
breed [n-docile]
breed [b-docile]
breed [a-docile]
breed [h-docile]
turtles-own [h nfIS qoI payoff CostSeeking CostSharing ]
;; h is the level in hierarchy
;; nfIS is the need for information-seeking which is highest in highly docile and lowest ;;to null
in non-docile
;; i.e. highly docile need huge amount of info so their nfIS is high
;; qoI is the quality of information shared which is highest for highly docile and lowest ;;to null
;;in non-docile
;; i.e. highly docile share high quality of info
;; I have defined agents docility on the basis of their nfIS and qoI shared with others.
n-docile-own [ nfit ]
b-docile-own [ bfit ]
a-docile-own [ afit ]
h-docile-own [ hfit ]
to setup
;;;; (for this model to work with NetLogo's new plotting features,
;;;; __clear-all-and-reset-ticks should be replaced with clear-all at
;;;; the beginning of your setup procedure and reset-ticks at the end
;;;; of the procedure.)
__clear-all-and-reset-ticks
set-default-shape turtles "person"
setup-n-docile
setup-b-docile
setup-a-docile
setup-h-docile
hierarchy ;; calls hierarchy function which assigns a hierarchical number to these agents
end
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;;;;;;;;;; Functions to create agents having different levels of docility ;;;;;;;;;;;;;
;;;;;;;;;;;          assign random values to nfIS and qoI                 ;;;;;;;;;;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

to setup-n-docile
crt initial#n-docile
[
setxy random-xcor random-ycor
set breed n-docile
set color yellow
set size 2
set nfIS random-float 0.1
;; random-float will return a number at least 0 but strictly less than 0.1.
;;non-docile does not use information coming from social channels
;;hence nfIS is lowest to null
set qoI random-float 0.1 ;; lowest qoI shared ; returns number with a mean of 1 and SD of 0.25
set payoff nfit
ifelse  CostSeeking_rate = 0
[ set CostSeeking 0 ]
```

256

[set CostSeeking (ln abs nfIS) / CostSeeking_rate]
;;this is the cost of seeking information, proportional on how often one seeks it
;; (it costs more the less one seeks) --- the value I thought of was 2

set CostSharing 0
;; zero for the n-d but a function of the quality for the others: (ln qoI) / 2

]
end

to setup-b-docile
crt Initial#b-docile
[
setxy random-xcor random-ycor
set breed b-docile
set color red
set size 2
set nfIS random-normal 0.25 0.05
;; random-normal reports a normally disturbed random
;;floating point number. b-docile slightly depend on social channels for information.mean 0.25 and SD
;;0.05 remember the graph

set qoI random-float 0.1
set payoff bfit
ifelse CostSeeking_rate = 0
[set CostSeeking 0]
[set CostSeeking (ln abs nfIS) / CostSeeking_rate]
set CostSharing 0
]
end

to setup-a-docile
crt Initial#a-docile
[
setxy random-xcor random-ycor
set breed a-docile
set color blue
set size 2
set nfIS random-normal 0.5 0.05
;; a-docile has average nfIS so mean 0.5 and SD 0.05
;; they mostly lean on information coming from social channels.
;;They do not need huge amount of info as do not intend to make new resources

set qoI random-normal 0.5 0.10
set payoff afit
ifelse CostSeeking_rate = 0
[set CostSeeking 0]
[set CostSeeking (ln abs nfIS) / CostSeeking_rate]
ifelse CostSharing_rate = 0
[set CostSharing 0]
[set CostSharing (ln abs qoI) / CostSharing_rate]
]
end

```
to setup-h-docile
crt Initial#h-docile
[
setxy random-xcor random-ycor
set breed h-docile
set color green
set size 2
set nfIS random-normal 0.75 0.05
;; h-docile has greatest nfIS as they seek information actively
;; so mean 0.75 and SD 0.05

set qoI random-normal 0.5 0.10
set payoff hfit
ifelse  CostSeeking_rate = 0
[ set CostSeeking 0 ]
[ set CostSeeking ( ln abs nfIS ) / CostSeeking_rate]
ifelse CostSharing_rate = 0
[ set CostSharing 0]
[ set CostSharing ( ln abs qoI ) / CostSharing_rate]
]
end
to go
if (count n-docile) / (count turtles) > .9 [ stop ]
if (count b-docile) / (count turtles) > .9 [ stop ]
if (count a-docile) / (count turtles) > .9 [ stop ]
if (count h-docile) / (count turtles) > .9 [ stop ]
if (count n-docile) / (count turtles) < 0.01 [ stop ]
if (count b-docile) / (count turtles) < 0.01 [ stop ]
if (count a-docile) / (count turtles) < 0.01 [ stop ]
if (count h-docile) / (count turtles) < 0.01 [ stop ]
if ( count n-docile = 0 ) or ( count b-docile = 0 ) or ( count a-docile = 0 ) or (count h-
docile = 0) or ( ticks > 1500) [stop]
relocate          ;; calls relocate functions which keeps agents away from the edges
ask turtles [formal]
;; calls the formal structure. when switch is 'on' hierarchical rules of interaction are
;; followed and links are created. When 'off' no links or rules are followed

ask turtles[fitness] ;; calls fitness function which calculates fitness of the agents having ;;different
;;hierachical levels.

interaction-mode     ;; calls the behaviour function where agents interact and influence each other
update-plot          ;; calls the graph procedure
tick                 ;; advances the tick counter by one and updates all plots/graph
end

to move
rt random-float 360   ;; this and the line below are together
fd 1
end
```

```
to hierarchy

  ask n-of ( 0.1 * ( count turtles )) turtles
   ;;  n-of reports number of agents at the top level by   ;;multiplying total# of turtles*0.1.
[ set h 1 ]
ask n-of ( 0.2 * ( count turtles )) turtles with [ h != 1]
[set h 2]
ask n-of ( 0.3 * ( count turtles )) turtles with [ h != 2 and h != 1 ]
[set h 3]
ask turtles with [ h = 0]
[set h 4]
end
to update-plot       ;; procedure for the graph/plot
set-current-plot "Frequency of levels of Docility"
set-current-plot-pen "nd"
plot count n-docile
set-current-plot-pen "bd"
plot count b-docile
set-current-plot-pen "ad"
plot count a-docile
set-current-plot-pen "hd"
plot count h-docile
set-current-plot-pen "bd + ad + hd"
plot count b-docile + count a-docile + count h-docile
end
```

```
;to informal
; if informal? [  ask turtles  [ create-links-with turtles with [ self != myself] in-radius range ] ]
;end
```

```
to formal
if formal? [
ask turtles with [self != myself] in-radius range
[
if  h = 1   [ create-links-with turtles with [ h <= 2 and self != myself ] in-radius range ]
if  h = 2   [ create-links-with turtles with [ h <= 3 and self != myself] in-radius range ]
```

```
if  h = 3   [ create-links-with turtles with [ h <= 4 and h != 1 and self != myself] in-
radius range ]
if  h = 4   [ create-links-with turtles with [ h >= 3 and self != myself] in-radius range ]
]
]
end


;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;;;;;;;;;        Function to calculate fitness of agents        ;;;;;;;;;;;
;;;;;;;;;;;        It is a modified model of Simon's model of fitness;;;;;;;;;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
to fitness
 ;; nfIS of self only as individual's need is dependent on the task or decision to be made.
;; qoI shared can influence others in the range.
move
ask n-docile with [ any? turtles with [ self != myself and breed != n-docile ] in-radius
range ]

[
set nfit ( natural_fitness + nfIS_discount * nfIS +
nfIS * ( mean [ qoI ] of turtles with [ breed != n-docile ] in-radius range ) * [qoI] of self)
- CostSeeking - CostSharing

set payoff nfit
]
ask b-docile with [ any? turtles with [ self != myself and breed != n-docile ] in-radius
range ]
[
set bfit ( natural_fitness + nfIS_discount * nfIS +
nfIS * ( mean [ qoI ] of turtles with [ breed != n-docile ] in-radius range ) * [qoI] of self)
- CostSeeking - CostSharing
set payoff bfit
]

ask a-docile with [ any? turtles with [ self != myself and breed != n-docile ] in-radius
range ]
[
set afit ( natural_fitness + nfIS_discount * nfIS +
nfIS * ( mean [ qoI ] of turtles with [ breed != n-docile ] in-radius range ) * [qoI] of self)
- CostSeeking - CostSharing
set payoff afit
]

ask h-docile with [ any? turtles with [ self != myself and breed != n-docile ] in-radius
range ]
[
set hfit ( natural_fitness + nfIS_discount * nfIS +
nfIS * ( mean [ qoI ] of turtles with [ breed != n-docile ] in-radius range ) * [qoI] of self)
- CostSeeking - CostSharing
set payoff hfit
]
end
```

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;;;;;;;;          Function of Interaction          ;;;;;;;;;
;;;;;;;;;;          - calculates fitness of agents in range   ;;;;;;;;;;
;;;;;;;;;;             - if fitness of one type of agent is      ;;;;;;;;;
;;;;;;;;;;;;  greater than mean payoff of turtles in range;;;;;;;;;;;
;;;;;;;;;;;;   the breed of turtles in range will change to ;;;;;;;;;;;;
;;;;;;;;;;            the higher fitness type           ;;;;;;;;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

to interaction-mode
ask n-docile with [ count turtles in-radius range > 0 ]
[ if [nfit] of self > mean ( [ payoff ] of turtles in-radius range) [
ask turtles in-radius range [
set breed n-docile
set color yellow
set payoff nfit ]
]
]

ask b-docile with [ count turtles in-radius range > 0 ]
[ if [bfit] of self > mean ( [ payoff ] of turtles in-radius range) [
ask turtles in-radius range [
set breed b-docile
set color red
set payoff bfit ]

]
]

ask a-docile with [ count turtles in-radius range > 0 ]
[ if [afit] of self > mean ( [ payoff ] of turtles in-radius range) [
ask turtles in-radius range [
set breed a-docile
set color blue
set payoff afit ]
]
]

ask h-docile with [ count turtles in-radius range > 0 ]
[ if [hfit] of self > mean ( [ payoff ] of turtles in-radius range) [
ask turtles in-radius range [
set breed h-docile
set color green
set payoff hfit ]
]
]
end


to relocate
if avoid-edges [
ask turtles [
if ( xcor = 50) or (ycor = 50)   [ setxy random-xcor random-ycor ]
```

```
if ( xcor = -50) or (ycor = -50) [ setxy random-xcor random-ycor ]
]
]
end
to-report Total-initial-agents
ifelse any? turtles
[ report (initial#n-docile + initial#b-docile + initial#a-docile + initial#h-docile)]
[ report 0 ]
end
to-report After-run-agents
ifelse any? turtles
[ report ( count (n-docile) + count (b-docile) + count (a-docile) + count (h-docile))]
[ report 0 ]
end
```

Appendix 5: Glossaries

Bounded Rationality: Human beings (and other creatures) do not behave optimally for their fitness, because they are wholly incapable of acquiring the knowledge and making the calculations that would support optimization. They do not know all of the alternatives that are available for action; they have only incomplete and uncertain knowledge about the environmental variables, present and future, that will determine the consequences of their choices; and they would be unable to make the computations required for optimal choice even if they had perfect knowledge.

Distributed Cognition Approach: Theory of distributed cognition states that knowledge and cognition lies not only within the individual, but it is distributed across objects, individuals, artefacts, and tools in the social and physical environment.

Docility: Docility is the tendency to depend on suggestions, perceptions, comments, and to gather information from other individuals, on the one hand, and to 'provide' information, on the other.

Feedback-seeking Behaviour: Proactive search by individuals for informal, evaluative information

Personality: A pattern of relatively permanent traits and unique characteristics that give both consistency and individuality to a person's behaviour

Moderator: A variable (M) is said to moderate the relationship between an antecedent (X) and consequence (Y) when the relationship between X and Y varies at different levels of the moderator M.

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