LEADERSHIP STYLES AND SAFETY BEHAVIOURS WITH SAFETY CLIMATE AS A MEDIATOR A MONG OIL AND GAS WORKERS

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ABSTRACT

Existing submissions from industry practitioners and researchers suggest a high rate of occupational accidents, injuries and fatalities occasioned by poor safety and health management systems, and attendant safety-related behaviours in the Nigerian oil and gas industry. In an attempt to improve employees' safety behaviours, this study investigated the relationship between leadership styles, safety climate and safety behaviours in the Nigerian O & G industry. Specifically, this study examines the influence of authentic leadership, inclusive leadership, safety climate on components of safety behaviours namely, safety compliance, safety participation and risky behaviour. Via a cross-sectional design and quantitative approach, the study was conducted among 319 systematically selected O & G workers in Rivers State, Nigeria. The PLS-SEM tool (SmartPLS 3.0) was used in analyzing the data collected from the respondents. The findings of the study indicated that the direct relationships between authentic and inclusive leadership styles with safety climate were positively significant. Also, the study found direct significantly positive relationships between safety climate and safety compliance and safety participation. However, the relationship between safety climate and risky behaviour was negative. Similarly, safety climate mediated the relationship between the authentic and inclusive leadership styles with safety compliance and safety participation, but not with risky behaviour. Based on the findings, it can be concluded that the authentic leadership and inclusive leadership styles are critical to positively shaping the safety climate perceptions of O & G workers. Positively shaped safety climate perceptions should in-turn determine the positive safety behaviours of the workers. Consequently, theoretical and practical implications, in addition to recommendations for future research are holistically discussed.

Keywords: Authentic Leadership, Inclusive Leadership, Safety Climate, Safety Behaviour, Oil and Gas Industry, Nigeria

ABSTRAK

Maklumat sedia ada daripada pengamal industri dan penyelidik menunjukkan kadar kemalangan, kecederaan dan kematian yang tinggi dalam pekerjaan. Hal ini berpunca daripada sistem pengurusan keselamatan dan kesihatan yang lemah, dan tingkah laku berkaitan keselamatan atendan dalam industri minyak dan gas di Nigeria. Dalam usaha untuk meningkatkan aspek tingkah laku keselamatan pekerja, kajian ini menyelidik hubungan antara gaya kepimpinan, iklim keselamatan dan tingkah laku keselamatan dalam industri minyak dan gas di Nigeria. Kajian ini menyelidik secara menyeluruh pengaruh kepimpinan autentik, kepimpinan inklusif, iklim keselamatan dan komponen tingkah laku keselamatan iaitu, pematuhan keselamatan, penyertaan keselamatan dan tingkah laku berisiko. Melalui reka bentuk keratan rentas dan pendekatan kuantitatif, kajian ini dijalankan ke atas 319 orang pekerja minyak dan gas yang dipilih secara sistematik di Rivers State, Nigeria. Perisian PLS-SEM (SmartPLS 3.0) digunakan untuk menganalisis data yang diperoleh daripada responden. Dapatan kajian menunjukkan bahawa hubungan langsung antara gaya kepimpinan autentik dan gaya kepimpinan inklusif dengan iklim keselamatan adalah positif secara signifikan. Kajian ini juga menemui hubungan langsung yang positif dan signifikan antara iklim keselamatan dan pematuhan keselamatan, serta penyertaan keselamatan. Walau bagaimanapun, hubungan di antara persekitaran keselamatan dan tingkah laku berisiko adalah negatif. Iklim keselamatan juga didapati mengantarakan hubungan antara gaya kepimpinan autentik dan gaya kepimpinan inklusif dengan pematuhan keselamatan serta penyertaan keselamatan, tetapi tidak bagi tingkah laku berisiko. Berdasarkan hasil kajian, dapat disimpulkan bahawa gaya kepimpinan autentik dan gaya kepimpinan inklusif adalah penting untuk membentuk persepsi positif iklim keselamatan pekerja industri minyak dan gas. Persepsi positif iklim keselamatan ini seterusnya menentukan tingkah laku positif keselamatan pekerja. Seterusnya, selain cadangan untuk kajian akan datang, implikasi teori dan praktikal turut dibincangkan secara holistik.

Kata kunci: kepimpinan autentik, kepimpinan inklusif, iklim keselamatan, tingkah laku keselamatan, industri minyak dan gas, Nigeria

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-- John F. Kennedy.

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LIST OF ABBREVIATIONS

O & G	Oil and Gas
GDP	Gross Domestic Product
OSH	Occupational Safety and Health
HSE	Health, Safety and Environment
NNPC	Nigerian National Petroleum Corporation
OPEC	Organization of the Petroleum Exporting Countries
SET	Social Exchange Theory
SST	Social Systems Theory
HPWS	High Performance Work Systems
SMPs	Safety Management Practices
DPR	Department of Petroleum Resources
CMV	Commom Method Variance
AVE	Average Variance Extracted
MV	Common Method Variance
PhD	Doctor of Philosophy
PLS	Partial Least Squares
Q^2	Construct Cross-validated Redundancy
R^2	R-squared values
SEM	Structural Equation Modelling
SET	Social Exchange Theory
SPSS	Statistical Package for the Social Sciences

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Workplace safety has been identified as an integral part of organizational activities (Beus, Payne, Bergman, & Arthur, 2010; Cagno, Micheli, Jacinto, & Masi, 2014; Sinelnikov, Inouye, & Kerper, 2015), yet remains a serious challenge in view of workers' continuous exposure to chemical, ergonomic, biological, psychosocial and related hazards (Leka, Jain, Iavicoli, Vartia, & Ertel, 2011; Lievens & Vlerick, 2013). Interestingly, the increasing cases of major accidents, injuries and work-related incidences have contributed to the growing concern among industry practitioners and researchers on the need to improve safety in workplaces (Cavazza & Serpe, 2009; Goh, Love, Stagbouer, & Annesley, 2012; Li, Jiang, Yao, & Li, 2013). Also, the increasing direct and indirect costs associated with these occurrences of workplace accidents, injuries and possible eventual fatalities have further contributed to the growing attention being paid to improving workplace safety (Neal & Griffin, 2002; Shalini, 2009).

Direct costs associated with workplace incidents accrue to companies in the form of medical and health bills, claims for permanent incapacitation and death, damages to work equipment, forfeitures, penalties, legal liabilities and continuous expenses for improvements to HSE activities (Pessemier, 2009; Moore, 2009; Battaglia, Marco, & Passetti, 2014). On the contrary, indirect costs accruable as a result of workplace incidents accrue in the form of production losses, increases in insurance costs, loss of confidence, absenteeism, increased staff turnover and denting of corporate image

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Research Questionnaire

15th May, 2016.

Dear Respondent,

ACADEMIC RESEARCH QUESTIONNAIRE

I am a PhD candidate at the Universiti Utara Malaysia, and currently conducting a research on leadership, safety climate and safety behaviours in the Oil & Gas industry in Rivers State, Nigeria as part of the requirements for the award of a Ph.D. degree.

I realize that your time is valuable and many demands are made upon it by your heavy workload. However, your participation in this survey, which will require only about 10-15 minutes of your time, is vital to the success of this study and would be greatly appreciated. Please be assured that your responses will be treated with utmost confidentiality and used purely for academic purposes.

Thanking you for your kind co-operation.

Yours truly,

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SECTION A: DEMOGRAPHIC INFORMATION

Please tick (✓) in the appropriate boxes that correspond to the questions below.

1. Gender: ☐ Male ☐ Female
2. Marital Status: ☐ Single ☐ Married ☐ Divorced ☐ Widowed
3. Age (in years): ☐ Less than 20 ☐ 21 – 24 ☐ 25 – 29 ☐ 30 – 34 ☐ 35 – 39 ☐ 40 - 44 ☐ 45 – 49 ☐ 50 and above
4. Level of Education: ☐ High School ☐ Technical/Diploma ☐ Bachelors ☐ Masters and above
5. Work experience in this company: Year (s):…… Month(s):…….
6. Work experience in the Oil and Gas Industry: Year (s):……..…
7. Occupation:

☐ Technician/Millwright ☐ Engineer ☐ Equipment Handler
☐ Scaffolder ☐ Electrician ☐ Operator
☐ Pipe/Steel Worker ☐ HVAC ☐ Plant Maintenance
☐ Mechanic ☐ Welder ☐ Driller
☐ Rigger ☐ Safety Personnel ☐ Concrete Worker
☐ Transportation/Logistics ☐ Others:……..

8. How often do you attend safety trainings?
   ☐ Never ☐ Rarely
   ☐ Sometimes ☐ Often
   ☐ Always
9. How many times have you been involved in a workplace accident in the last 12 months?_____

Section B

The following are statements pertaining to your leader. Please note the term "leader" refers to your **immediate supervisor**. On a five-point scale, indicate your level of

agreement on the statements stated hereunder by circling the responses according to the scale below:

1	-	*Strongly Disagree*
2	-	*Disagree*
3	-	*Neither Agree nor Disagree*
4	-	*Agree*
5	-	*Strongly Agree*

My Leader…

1	**solicits feedback for improving his/her dealings with others.**	**1**	**2**	**3**	**4**	**5**
2	is available for professional questions I would like to consult with him/her.	1	2	3	4	5
3	encourages others to voice opposing points of view.	1	2	3	4	5
4	shows interest in the safety of workers in the workplace.	1	2	3	4	5
5	describes accurately the way that others view his/her abilities.	1	2	3	4	5
6	ensures there is sufficient opportunity to discuss and deal with safety issues in meetings.	1	2	3	4	5
7	uses his/her core beliefs to make decisions.	1	2	3	4	5
8	ensures newly recruits are trained adequately to learn safety rules and procedures.	1	2	3	4	5
9	shows that he/she understands his/her strengths and weaknesses.	1	2	3	4	5
10	asks for ideas that challenge his/her core beliefs.	1	2	3	4	5
11	resists pressures on him/her to do things contrary to his/her beliefs.	1	2	3	4	5
12	gives high priority to safety in training programmes.	1	2	3	4	5
13	is clearly aware of the impact he/she has on others.	1	2	3	4	5
14	ensures the safety rules and procedures followed in the company are sufficient to prevent incidents from occurring.	1	2	3	4	5
15	is guided in his/her actions by internal moral standards.	1	2	3	4	5
16	considers safety to be equally important as production/work targets.	1	2	3	4	5

17	is open to hearing new ideas.	1	2	3	4	5
18	gives high priority to safety in the workplace.	1	2	3	4	5
19	is open to discuss the desired goals and new ways to achieve them.	1	2	3	4	5
20	ensures that employees can communicate hazard information before incidents occur through the hazard reporting system.	1	2	3	4	5
21	is an ongoing 'presence' in this team—someone who is readily available.	1	2	3	4	5
22	ensures the safety training given to employees is adequate to enable them to assess hazards in work areas.	1	2	3	4	5
23	is ready to listen to my requests.	1	2	3	4	5
24	encourages me to access him/her on emerging issues.	1	2	3	4	5
25	is accessible for discussing emerging problems.	1	2	3	4	5
26	ensures that the company's open door policy on safety issues is practiced.	1	2	3	4	5
27	clearly states what he/she means.	1	2	3	4	5
28	encourages workers to attend safety training programmes.	1	2	3	4	5
29	carefully listens to alternative perspectives before reaching a conclusion.	1	2	3	4	5
30	ensures comprehensive training is given to the employees in workplace health and safety issues.	1	2	3	4	5
31	expresses his/her ideas and thoughts clearly to others.	1	2	3	4	5
32	attends safety meetings.	1	2	3	4	5
33	takes corrective action when told about unsafe practices.	1	2	3	4	5
34	ensures the facilities in the safety department are adequate to meet the needs of the organization.	1	2	3	4	5
35	shows consistency between his/her beliefs and actions.	1	2	3	4	5
36	ensures the target and goals for safety performance in the organization is clear to workers.	1	2	3	4	5
37	ensures participation of employees in regular safety inspections.	1	2	3	4	5

38	openly shares information with others.	1	2	3	4	5
39	is attentive to new opportunities to improve work processes.	1	2	3	4	5
40	always try to enforce safe working procedures.	1	2	3	4	5
41	admits mistakes when they occur.	1	2	3	4	5
42	ensures open communication about safety issues in the workplace.	1	2	3	4	5
43	acts quickly to solve the problems when near-miss accidents are reported.	1	2	3	4	5
44	objectively analyzes relevant data before making a decision.	1	2	3	4	5
45	is available for consultation on problems.	1	2	3	4	5

Section C

The following are statements pertaining to your own behaviour at the workplace. On a five-point scale, please indicate your level of agreement on the statements stated hereunder by circling the responses according to the scale below:

1 - *Strongly Disagree*
2 - *Disagree*
3 - *Neither Agree nor Disagree*
4 - *Agree*
5 - *Strongly Agree.*

1	**I use all necessary safety equipment to do my job.**	**1**	**2**	**3**	**4**	**5**
2	I help my co-workers when they are working under risky or hazardous conditions.	1	2	3	4	5
3	I voluntarily carryout tasks or activities that help to improve workplace safety.	1	2	3	4	5
4	I ensure the highest levels of safety when I carry out my job.	1	2	3	4	5
5	I break rules due to management pressure.	1	2	3	4	5
6	I take shortcuts that involve little or no risk.	1	2	3	4	5

7	I always point out to the management if any safety related matters are noticed in my company.	1	2	3	4	5
8	I put extra effort to improve the safety of the workplace.	1	2	3	4	5
9	I take chances to get the job done.	1	2	3	4	5
10	I encourage my co-workers to work safely.	1	2	3	4	5
11	I ignore safety regulations to get the job done.	1	2	3	4	5
12	I break work procedures.	1	2	3	4	5
13	I follow correct safety rules and procedures while carrying out my job.	1	2	3	4	5
14	I bend safety rules to achieve a target.	1	2	3	4	5
15	I get the job done better by ignoring some rules.	1	2	3	4	5
16	Conditions at the workplace keep me from working according to the rules.	1	2	3	4	5
17	I carry out my work in a safe manner.	1	2	3	4	5
18	It is always practical to follow all safety rules and procedures while doing a job.	1	2	3	4	5
19	I am pressured by my workmates to break rules.	1	2	3	4	5

Thank you for your time.

REVIEW OF ARTICLES

S/No	Author(s), Title,	Research Issue(s), Study Variables	Method	Finding	Issues, Gaps and Future Research
1.	Nielsen *et al*. (2013). Authentic leadership and its relationship with risk perception and safety climate.	This study aims to examine how authentic leadership relates to risk perception in safety critical organizations (SCOs). It is hypothesized that authentic leaders influence risk perception through the mediating effect of safety climate.	Using a survey design, the variables were assessed in a cross-sectional sample of 293 offshore oil installation workers from a single company.	Authentic leadership are negatively related to risk perception and positively associated with ratings of safety climate. Controlling for personality characteristics and leadership responsibility among respondents, the results confirm the hypothesis in that safety climate mediates the relationship between authentic leadership and risk perception. Safety climate had the strongest relationship with risk perception when assessed as a higher order construct.	More research is clearly necessary to fully comprehend the nature of the relationship between the variables. Supported basis for hypotheses
2.	Eid, *et al*. (2012). Leadership, psychological capital and safety research: Conceptual issues and future research questions.	Identify potential mechanisms that can explain how leadership affects safety outcomes. Authentic leadership – safety climate – Safety outcomes	Literature review on AL and safety outcomes with specific focus on the offshore O & G industry	From this we offer a research model and five research propositions implicating that authentic leadership directly affects safety outcomes via promoting positive safety climate perceptions.	Need to examine the relationship between authentic leadership and safety climate in safety critical organizations.
3.	Peus *et al*. (2012). Authentic Leadership: An Empirical Test of Its	Examine the antecedents and individual as well as group-level outcomes of AL in business as well	Longitudinal analysis. (Study 1; n = 306; (Study 2; n = 105).	Findings reveal leader self-knowledge and self-consistency as antecedents of authentic leadership and followers'	Further studies to determine exactly what components of authentic leadership

	Antecedents, Consequences, and Mediating Mechanisms.	as research organizations. First, we sought to investigate if the relation between perceived AL, leader predictability and followers' work-related attitudes could be replicated.		satisfaction with supervisor, organizational commitment, and extra effort as well as perceived team effectiveness as outcomes. The relations between authentic leadership and followers' work-related attitudes as well as perceived team effectiveness are mediated by perceived predictability of the leader, a particular facet of trust.	are crucial for follower attitudes and how they are influenced by situational variables. Deeper understanding of how AL impacts followers, their organizations, and the leaders themselves and how this type of leadership can be developed.
4.	Cavazotte, *et al*. (2013). Authentic leader, safe work: the influence of leadership on safety performance.	This study analyzed the influence of authentic leadership on the workers' safety performance, investigating the psychological mechanisms that explain the connection between authenticity and workplace safety.	The study was conducted based on a sample of 186 workers involved in projects within the oil industry in Brazil. Positivist approach.	Results suggested that authentic leadership is associated with the feedback provided by supervisors as well as with worker's perception of justice and their safety performance. Furthermore, perception of justice seems to be a relevant route through which more authentic leaders would promote safe behaviors among their followers. It was also observed that individuals who are more conscientious and less prone to take risks are also those who engage more frequently in safe behavior in the workplace.	This work represents a contribution to the advancement of knowledge about authentic leadership and safety performance because empirical studies investigating the association between the two are rare until now. More studies on AL with specific focus on workplace safety.
5.	Borgersen, *et al*.	This study examined	Positivist.	AL made a statistically	AL scarcely

	(2014). Authentic leadership and safety climate among seafarers.	relationships between *authentic leadership* and *safety climate* among 463 seafarers sailing on 23 merchant vessels in the international shipping industry. Philippines	Questionnaires administration. Regression	significant contribution to explaining variance in safety climate, controlling for age, rank on board, and social desirable responding. The present study contributes to the literature in that AL emerged as a significant predictor of perceived safety climate variance in a research setting which has not been investigated earlier.	examined. Need for further studies.
6.	Hystad, *et al*. (2014). Positive organizational behavior and safety in the offshore oil industry: Exploring the determinants of positive safety climate.	Test workplace and individual factors that may affect safety climate. Specifically, we explore the potential influence of AL and psychological capital on safety climate and risk outcomes.	Norway Offshore O & G workers. Positivist. Questionnaire administration. SEM used for analysis	Across two samples of offshore oil-workers and seafarers working on oil platform supply ships, structural equation modeling yielded results that support a model in which AL exerts a direct effect on safety climate, as well as an indirect effect via psychological capital.	Scant attention to the question of what factors might be responsible for positive or negative safety climate. Additional studies encouraged.
7.	Neider and Schreisheim (2011). The Authentic Leadership Inventory (ALI): Development and empirical tests.	This paper presents the development and preliminary validation of a new measure of authentic leadership, the Authentic Leadership Inventory (ALI).	Positivist. Instrument development and validation	Results indicate some concerns with the ALQ but support the content validity, reliability, factor structure, convergent and discriminant validity, concurrent validity, and freedom from impression management response bias of the ALI	Future research would better be served by using separate authentic and transformational dimensions (rather than aggregate or global measures) to understand the unique aspects of

					both leadership constructs.
8.	Laschinger, *et al*. (2012). The influence of authentic leadership on newly graduated nurses' experiences of workplace bullying, burnout and retention outcomes: A cross-sectional study.	The purpose of this study is to test a model linking authentic leadership to new graduate nurses' experiences of workplace bullying and burnout, and subsequently, job satisfaction and intentions to leave their jobs.	Cross-sectional survey design with 342 new graduate nurses working in acute care hospitals in Ontario, Canada. The model was tested using path analysis techniques plus SEM.	AL had a negative direct effect on workplace bullying, which in turn had a direct positive effect on emotional exhaustion. Authentic leadership also influenced job satisfaction indirectly through bullying and emotional exhaustion. Authentic leadership, workplace bullying and emotional exhaustion all had significant direct effects on job satisfaction, which in turn, was related to lower turnover intentions.	The findings from this study demonstrate the fundamental importance of AL in creating supportive working environments. Additional literature on AL.
9.	Carmeli, *et al*. (2010). Inclusive leadership and employee involvement in creative tasks in the workplace: The mediating role of psychological safety.	This study examines how IL (manifested by openness, accessibility, and availability of a leader) fosters employee creativity in the workplace.	Quantitative. SEM analysis	The results of structural equation modeling (SEM) analysis indicate that IL is positively related to psychological safety, which, in turn, engenders employee involvement in creative work.	Further studies expecting on IL with related organizational factors and outcomes
10.	Choi *et al*. (2015). Inclusive leadership and work engagement:	Examined the mediating roles of affective organizational commitment and	Quantitative. Use of questionnaire among employees	We found that inclusive leadership was positively related to employee work engagement, and that both affective	Theoretical contribution to SET and provide useful managerial

	mediating roles of affective organizational commitment and creativity.	employee creativity in the relationship IL and employee work engagement.		organizational commitment and employee creativity mediated this relationship.	implications for organizations to improve work engagement among employees.
11	Wuffli, P. A. (2016). Introduction: A Framework for Inclusive Leadership. In	Definition. Theoretical perspectives			Need to really examine IL
12.	Hollander, E. (2012). *Inclusive leadership: The essential leader-follower relationship*. New York, NY:	Insights into IL			Need to examine IL
13.	Neal and Griffin (2006). A Study of the Lagged Relationships Among Safety Climate, Safety Motivation, Safety Behavior, and Accidents at the Individual and Group Levels.	Perceptions of safety climate, motivation, and behavior at 2 time points and linked them to prior and subsequent levels of accidents over a 5-year period. Safety Climate, Motivation and Safety Behaviour	Longitudinal survey in the healthcare industry. Questionnaire used	In terms of top-down effects, average levels of safety climate within groups at one point in time predicted subsequent changes in individual safety motivation. Individual safety motivation, in turn, was associated with subsequent changes in self-reported safety behavior. In terms of bottom-up effects, improvements in the average level of safety behavior within groups were associated with a subsequent reduction in accidents at the group level.	Historical perspectives of safety behaviours
14.	Zohar (2002). The	This study is based on	Within-group split	(a) Leadership style affects the	Exposes on safety

	effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups.	three premises: (a) Leadership style affects the level of concern for subordinate safety; (b) Concern for safety, operationalized with supervisory practices, provides the source for safety climate perceptions; and (c) Safety priority as assigned by higher superiors' influences supervisory safety practice independently of leadership style.	sample analysis. Step-wise and group-wise regression	level of concern for subordinate safety; (b) Concern for safety, operationalized with supervisory practices, provides the source for safety climate perceptions; and (c) Safety priority as assigned by higher superiors' influences supervisory safety practice independently of leadership style. Leadership effects were moderated by assigned safety priorities and mediated by commensurate safety-climate variables. The results suggest that transformational and transactional leadership provide complementary modes of (mediated and moderated) influence on safety behavior.	climate. Dimensions and importance of safety climate in predicting safety outcomes. How leadership is related to safety climate and safety outcomes also discussed and need for further studies highlighted.
15.	Tholen *et al*. (2013) - Causal relations between psychosocial conditions, safety climate and safety behaviour – A multi-level investigation	289 construction employees	Positivist	Results showed that individual perceptions of safety climate exerted a causal effect on individual safety behaviour, but we also found some evidence of a reversed relationship, where safety behaviour influenced safety climate. Furthermore, we found that work unit average perceptions of safety climate predicted the growth of the individual safety behavior but this influence was mediated by	SB and reverse. SB influencing SC SC

				the individual's perception of the safety climate. The results also indicate that supportive psychosocial conditions within an organisation influence individual safety perceptions but do not per se have an impact on safety behaviour.	
16.	Huang *et al*. (2006) - Safety climate and self-reported injury: Assessing the mediating role of employee safety control		Positivist	Factorial evidence substantiated that management commitment to safety, return-to-work policies, post-injury administration, and safety training are important dimensions of safety climate. In addition, the data support that safety climate is a critical factor predicting the history of a self-reported occupational injury, and that employee safety control mediates the relationship between safety climate and occupational injury.	Safety behaviours and self-reported injury MCS,RTW policies etc
17.	Griffin and Neal (2000) - Perceptions of Safety at Work: A Framework for Linking Safety Climate to Safety Performance, Knowledge, and Motivation	1403 Australian manufacturing	Positivist	Perceptions of knowledge about safety and motivation to perform safely influenced individual reports of safety performance and also mediated the link between SC and safety performance. Specific dimensions of safety climate were identified and constituted a	Safety behaviour Proposed framework, early insights on conceptualization of safety behaviour.

				higher order safety climate factor. The results support conceptualizing safety climate as an antecedent to safety performance in organizations.	
18.	Olsen (2010) - Exploring the possibility of a common structural model measuring associations between safety climate factors and safety behaviour in health care and the petroleum sectors	1919 and 1806 health care and petroleum questionnaire	Longitudinal. Positivist	SC Validation on SC factors	Safety behaviours explained and need to for further studies explained.
19.	Huang *et al*. (2012) Management commitment to safety vs. employee perceived safety training and association with future injury	MCS and SC	Positivist	Even though results showed that the correlation between employees' perceived safety training and management commitment to safety was high, CFA of measurement models showed that two separate factors fit the model better than as two dimensions of a single factor	Injuries compliance and participation
20.	Evans *et al*. (2007) - Development and initial validation of an Aviation Safety Climate Scale.	A need was identified for a consistent set of safety climate factors to provide a basis for aviation industry benchmarking.	Positivist	The results of this study have produced a scale of safety climate for aviation that is both reliable and valid.	Safety behaviours MCS, ST, Communication, equipment and maintenance. Need to further study safety climate.

21.	Morrow *et al*. (2014) Exploring the relationship between safety culture and safety performance in U.S. nuclear power operations	Safety Culture, Safety Climate, safety behaviours	Positivist	Correlations suggested meaningful, statistically significant relationships between safety culture, as measured by the survey, and multiple nuclear power plant performance indicators.	Safety Compliance and safety participation. Further studies needed.
22.	Seo *et al*. (2004) - A cross-validation of safety climate scale using confirmatory factor analytic approach.	This study tested the stability of a factor structure of a safety climate scale developed through an extensive literature review using confirmatory factor analytic approach and cross-validation.	Meta-analysis	Each item of safety climate showed proper discriminative power based on both internal and external criteria. Criterion validity was manifested by the significant positive correlation of the scale with five criteria. Evidence of construct validity was provided by both exploratory and confirmatory factor analyses. Both calibration and validation samples supported a consistent factor structure. Management commitment and supervisor support were found to influence other dimensions of safety climate.	Safety behaviours - compliance and participation and reduction of injuries. Gap on consistent factor structure of safety climate.
23.	Fernandez-Muniz *et al*. (2012). Safety climate in - OHSAS 18001-certified	To analyse the safety climate in these organisations, identify its dimensions, and	Meta-analysis	The results show that management's commitment, and particularly communication, have an effect	Employee satisfaction and firm competiveness. Different

	organisations: Antecedents and consequences of safety behavior.	propose and test a structural equation model that will help determine the antecedents and consequences of employees' safety behaviour. MCS, SC		on safety behaviour and on safety performance, employee satisfaction, and firm competitiveness	dimensions of safety performance. Gaps. Additional studies on safety performance.
24.	Bosak *et al* (2013) - Safety climate dimensions as predictors for risk behavior.	This study examines the interactive relationship between three dimensions of safety climate (management commitment to safety, priority of safety, and pressure for production), and their impact on risk behavior reported by employees.		The results showed that, employees' risk behavior was negatively related to MCS and priority of safety and positively related to pressure for production. Moreover, the three-way interaction between MCS, priority of safety and pressure for production was significant. When pressure for production was high, MCS was negatively related to risk behavior, regardless of level of priority of safety on plant. When pressure for production was low, the effect of MCS on risk behavior was nullified under conditions of high, as compared to low priority of safety on plant.	Risky behaviour. Additional study needed. These findings highlight the importance of managerial commitment to safety in contexts where employees experience tensions between production deadlines and safety procedures.
25.	Kapp (2012) - The influence of supervisor leadership practices and perceived group	Leadership practices and safety behaviour	Positivist. Use of questionnaire	Results indicate that greater levels of transformational and contingent reward leadership are both associated with greater levels of safety compliance and	Future studies

	safety climate on employee safety performance			safety participation behavior, however group safety climate moderates the leadership-safety compliance relationships.	
26.	Zohar and Luria (2010) Group Leaders as Gatekeepers: Testing Safety Climate Variations across Levels of Analysis.	The moderating effect of transformational supervisory leadership on the relationship between organisational and group climates, using safety climate in risky operations as an exemplar.		Results indicated that under low or poor organisational climate, indicative of limited organisational commitment to employee safety, transformational leaders promoted a higher group climate as compared to the organisational climate. Similarly, under a weak organisational climate, indicative of limited consensus among company employees regarding the priority of safety, transformational leaders promoted a stronger group climate, reflecting greater consensus among group members.	Compliance and Participation. The need for further studies on leadership in the safety management. Leadership as an antecedent of safety climate.
27.	Kines *et al.* (2010) Improving construction site safety through leader-based verbal safety communication.	This paper tests the effect of increasing leader-based on-site verbal safety communication on the level of safety and safety climate at construction sites.	Quantitative	Coaching construction site foremen to include safety in their daily verbal exchanges with workers has a significantly positive and lasting effect on the level of safety, which is a proximal estimate for work-related accidents.	Safety performance: compliance and participation. Leadership based communication.
28.	Lievens & Vlerick (2013) -	To report the impact of transformational	Cross-sectional survey with use of	The results show that transformational leadership	Compliance and Participation.

	Transformational leadership and safety performance among nurses: the mediating role of knowledge-related job characteristics.	leadership on two dimensions of nurses' safety performance (i.e. safety compliance and safety participation) and to study the mediating role of knowledge-related job characteristics in this relationship.	questionnaire	exerted a significant positive impact on both dimensions of nurses' safety performance. This positive relation was mediated by knowledge-related job characteristics, supporting our second hypothesis.	Transformational leadership and knowledge related job-characteristics as mediators. Further studies needed on leadership in safety management.
29.	Zohar (2010) - Thirty years of safety climate research: Reflections and future directions			The need to study the antecedents of safety climate in relation to safety behaviours	
30.	Vinodkumar and Bhasi (2010) - Safety management practices and safety behaviour: Assessing the mediating role of safety knowledge and motivation.	Measuring employees' perceptions on 6 SMPs and self-reported safety knowledge, safety motivation, safety compliance and safety participation.	Quantitative study done in a safety critical organization in India	Path analysis showed that some of the safety management practices have direct and indirect relations with the safety performance components, namely, safety compliance and safety participation. Safety knowledge and safety motivation were found to be the key mediators in explaining these relationships. Safety training was identified as the most important safety management practice that predicts safety knowledge, safety motivation, safety compliance and safety participation.	Additional studies in safety management with specific focus on safety behaviours.

31.	Mearns *et al*. (2003) - Safety climate, safety management practice and safety performance in offshore environments.	The present study reports on a cross-organisational survey designed to benchmark participating offshore installations on their safety climate, and to identify best safety management practices.	Cross-organizational survey	Proficiency in some safety management practices was associated with lower official accident rates and fewer respondents reporting accidents.	Safety Climate & Safety Management Practices. Additional studies needed.
32.	Cigularov *et al*. (2013) - Measurement equivalence and mean comparisons of a safety climate measure across construction trades.	This study used multi-group confirmatory factor analyses to investigate the measurement equivalence of a multidimensional safety climate measure across ten construction trade groups	Cross-sectional survey among 4725 construction trades. Use of CFA	Results revealed strong measurement equivalence of the safety climate measure across the construction trade groups	SC measures. Further insights to assess the relationship between SC and safety behaviours
33.	Cooper & Phillips (2004) - Exploratory analysis of the safety climate and safety behavior relationship.	Exploring the relationship between SC and safety behaviour	Questionnaire. 540 packaging production plant, manufacturing. Regression analysis.	Perceptions of the importance of safety training were predictive of actual levels of safety behavior. The results also demonstrate that the magnitude of change in perceptual safety climate scores will not necessarily match actual changes in employee's safety behavior.	Behaviours. Early studies in safety behaviours based on Borman and Motowidlo (1993).
34.	Martinez-Corcoles *et al*. (2013) - Empowering team leadership and safety	Team Leadership DV Compliance and	479 workers in 2 Spanish nuclear power plants.	Leaders' empowering behaviors generated higher safety compliance behaviors and higher safety participation	Team leader behaviors. Further asserts need to study risky behaviour as a

	performance in nuclear power plants: A multilevel approach.	Participation and Risky Behaviour		behaviors by team members, whereas risky behaviors were reduced.	component of safety behaviour
35.	Lu & Tsai (2010) - The effect of safety climate on seafarers' safety behaviors in container shipping.	This study empirically examined safety climate and its effects on safety behaviors from seafarers' perceptions in the container shipping context. DV Compliance and participation and accidents and injuries recorded	Stratified sampling Use of questionnaire among 608 seafarers. Mata-Analysis	A structural equation model was used to examine the effect of safety climate dimensions, namely, safety policy, perceived supervisor safety behavior, and safety management, on safety behavior. The results revealed a positive association between safety climate and seafarers' safety behavior.	Safety climate dimensions, namely, safety policy, perceived supervisor safety behavior, and safety management, on safety behavior. Refer for gaps on safety climate measures….and also safety performance measures
36.	Hon *et al*. (2014) - Relationships between safety climate and safety performance of building repair, maintenance, minor alteration, and addition (RMAA) works.	The present study aims to determine the relationships between safety climate and safety performance of RMAA works, thereby offering recommendations on improving RMAA safety.	Questionnaires analysed from 396 repairs and maintenance personnel	A significant negative relationship between RMAA safety climate and incidence of self-reported near misses and injuries, and significant positive relationships between RMAA safety climate and safety participation and safety compliance respectively. Higher RMAA safety climate was positively associated with a lower incidence of self-reported near misses and injuries and higher levels of safety participation and safety compliance.	Near misses and injuries and safety compliance and participation. Information on safety climate and safety performance measures. History of safety performance.

37.	Wu (2008) - Safety leadership in the teaching laboratories of electrical and electronic engineering departments at Taiwanese Universities.	The study discusses the factors affecting safety leadership in teaching laboratories. Safety leadership	Mail questionnaire survey among 147 university faculty in various departments.	The descriptive statistics also reveals that among faculty, the perception of department heads' safety leadership is in general positive. A two-way MANOVA shows that there are interaction effects on safety leadership between university size and instructor age; there are also interaction effects between presence of a safety committee and faculty gender and faculty age.	Safety leadership. Leadership in safety management
38.	Fernandez-Muniz *et al*. (2014) - Safety leadership, risk management and safety performance in Spanish firms.	The role of the safety leadership and of the proactive risk management in the improvement of occupational safety performance. Safety Leadership & risk management	Questionnaire and data analyzed among 159 construction and services workers in Spain	The results show the importance of employees' safety behaviour in the improvement of safety outcomes, as well as the importance of the proactive risk management and transformational leadership in promoting safety behaviour.	Compliance and Participation. Refer for study on safety leadership. Transactional or transformational leadership
39.	Bahari & Clarke (2013) Cross-validation of an employee safety climate model in Malaysia.	The current study focuses on the cross-validation of a safety climate model in the non-Western industrial context of Malaysian manufacturing.	50 employees from manufacturing companies. CFA	Results showed that the model fit indices were below accepted levels, indicating that the original Cheyne *et al*. (1998) safety climate model was not supported. An alternative three-factor model was developed using exploratory factor analysis.	Justification for studying the Nigerian setting. Inconsistencies noted. Model not supported. cross-cultural study.
40.	Huang *et al*. (2012)	Explore and examine,	Questionnaires of	Even though results showed that	Refer for questions

	Management commitment to safety vs. employee perceived safety training and association with future injury.	specific to the restaurant industry, two important constructs emerging from the safety climate literature: employee perceptions of safety training and management commitment to safety. MCS and SC Injuries compliance and participation	419 restaurant workers. With the use of multivariate binomial equation.	the correlation between employees' perceived safety training and management commitment to safety was high, confirmatory factor analysis of measurement models showed that two separate factors fit the model better than as two dimensions of a single factor	on MCS and ST. safety training and MCS as important components of SC
41.	Zohar and Luria (2010) Group Leaders as Gatekeepers: Testing Safety Climate Variations across Levels of Analysis.	This paper tests the moderating effect of transformational supervisory leadership on the relationship between organisational and group climates, using safety climate in risky operations as an exemplar.	Associational design. Testing a relationship among 3952 production workers	Results indicated that under low or poor organisational climate, indicative of limited organisational commitment to employee safety, transformational leaders promoted a higher group climate as compared to the organisational climate. Similarly, under a weak organisational climate, indicative of limited consensus among company employees regarding the priority of safety, transformational leaders promoted a stronger group climate, reflecting greater consensus among group member	Fragmentations exist. Further study on group level safety climate vis-à-vis improving organizational level safety climate
42.	Clarke (2013)	A theoretical model of safety leadership, which incorporated both	Meta-Analysis	The final model showed that transformational leadership had a positive association with both	The findings suggest that active transactional

		transformational and active transactional leadership styles, was tested using meta-analytic path analysis.		perceived safety climate and safety participation, with perceived safety climate partially mediating the effect of leadership on safety participation. Active transactional leadership had a positive association with perceived safety climate, safety participation and safety compliance. The effect of leadership on safety compliance was partially mediated by perceived safety climate and the effect on safety participation fully mediated by perceived safety climate.	leadership is important in ensuring compliance with rules and regulations, whereas transformational leadership is primarily associated with encouraging employee participation in safety. Therefore, in line with the augmentation hypothesis of leadership, a combination of both transformational and transactional styles appeared to be most beneficial for safety. There is little guidance available on leadership interventions that focus on a wider range of leader behaviour or focus on the ability to change between leadership styles to fit the requirements of the situation.

43.	Martinez-Corcoles *et al*. (2011). Leadership and employees' perceived safety behaviours in a nuclear power plant: A structural equation model	Study is to find out how leader behaviours influence employees' safety behaviours (perceived safety behaviours) in the nuclear field.	566 employees from a nuclear power plant	The results indicated that when safety culture was strong, leader behaviour generated a higher safety climate among the members, which predicted their perceived safety behaviours. Support was found for a structural model linking leadership and safety behaviour to safety culture and safety climate.	Further antecedents of safety climate. Formed foundation for present study.
Other studies that formed strong foundation for the present study. Barling *et al*. (2002) Clarke and Ward (2006) Kelloway *et al*. (2006) Beus *et al*. (2016) Bosak *et al*. (2013)					

SPSS OUTPUTS

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	288	90.3	90.3	90.3
	Female	31	9.7	9.7	100.0
	Total	319	100.0	100.0	

Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	92	28.8	28.8	28.8
	Married	205	64.3	64.3	93.1
	Divorced	12	3.8	3.8	96.9
	Widowed	10	3.1	3.1	100.0
	Total	319	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 20	4	1.3	1.3	1.3
	21-24	17	5.3	5.3	6.6
	25-29	66	20.7	20.7	27.3
	30-34	105	32.9	32.9	60.2
	35-39	77	24.1	24.1	84.3
	40-44	36	11.3	11.3	95.6
	45-49	10	3.1	3.1	98.7
	50 and above	4	1.3	1.3	100.0
	Total	319	100.0	100.0	

Level of Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School	57	17.9	17.9	17.9
	Technical/Diploma	217	68.0	68.0	85.9
	Bachelors'	42	13.2	13.2	99.1
	Masters and Above	3	.9	.9	100.0
	Total	319	100.0	100.0	

Present Company Work Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	157	49.2	49.2	49.2
	6-10	136	42.6	42.6	91.8
	11-15	26	8.2	8.2	100.0
	Total	319	100.0	100.0	

Oil and Gas Work Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	101	31.7	31.7	31.7
	6-10	181	56.7	56.7	88.4
	11-15	37	11.6	11.6	100.0
	Total	319	100.0	100.0	

Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Technician/Millwright	44	13.8	13.8	13.8
	Engineer	6	1.9	1.9	15.7
	Equipment Handler	27	8.5	8.5	24.1
	Scaffolder	18	5.6	5.6	29.8
	Electrician	33	10.3	10.3	40.1
	Operator	23	7.2	7.2	47.3
	Pipe/Steel Worker	10	3.1	3.1	50.5
	HVAC Operator	9	2.8	2.8	53.3
	Plant Maintenance	50	15.7	15.7	69.0
	Mechanic	13	4.1	4.1	73.0
	Welder	7	2.2	2.2	75.2
	Driller	39	12.2	12.2	87.5
	Rigger	8	2.5	2.5	90.0
	Safety Personnel and First Aider	5	1.6	1.6	91.5
	Concrete Worker	11	3.4	3.4	95.0
	Transportation and Logistics	13	4.1	4.1	99.1
	Others	3	.9	.9	100.0
	Total	319	100.0	100.0	

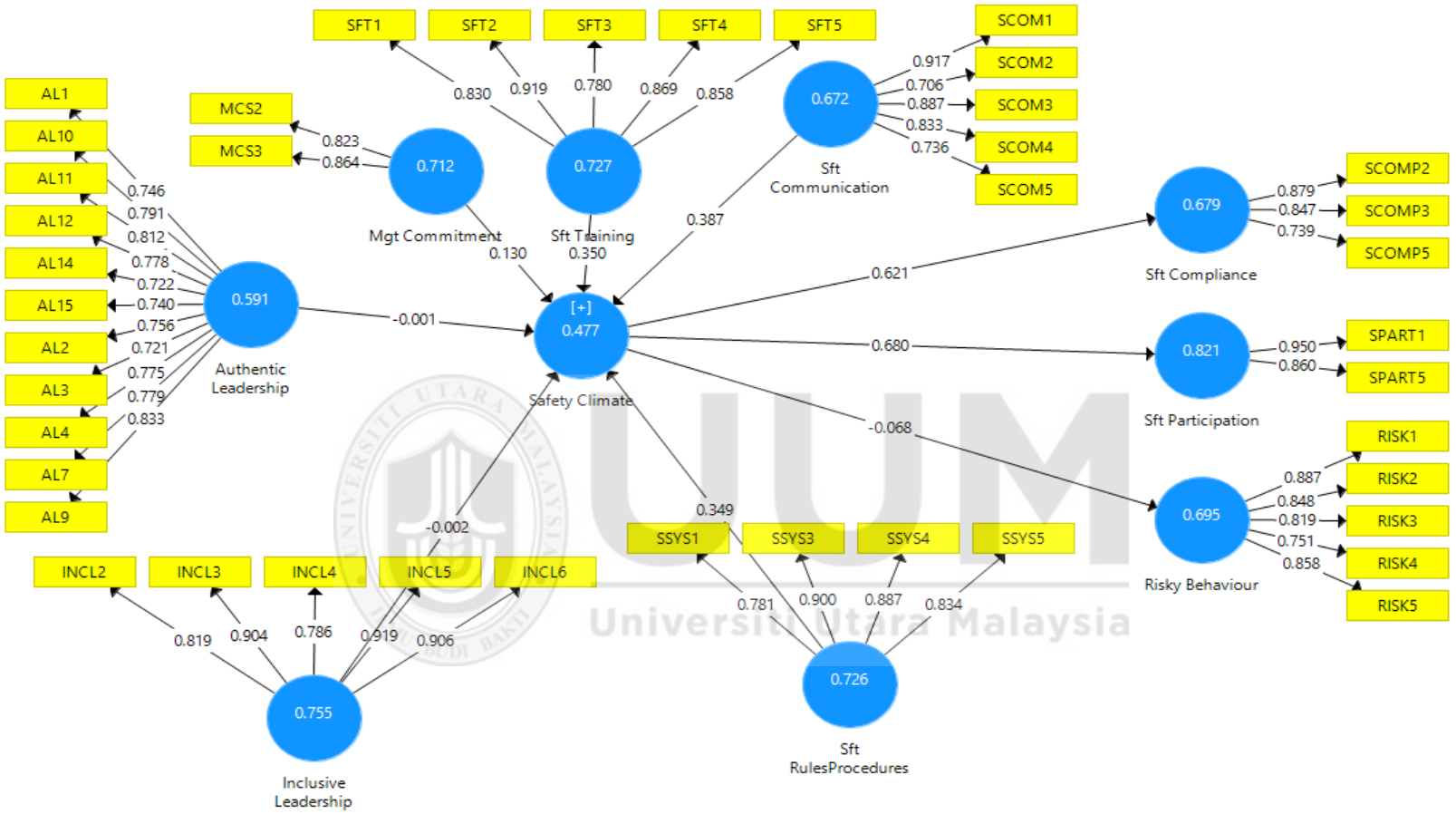
Frequency of attendance of Safety Training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sometimes	17	5.3	5.3	5.3
	Often	151	47.3	47.3	52.7
	Always	151	47.3	47.3	100.0
	Total	319	100.0	100.0	

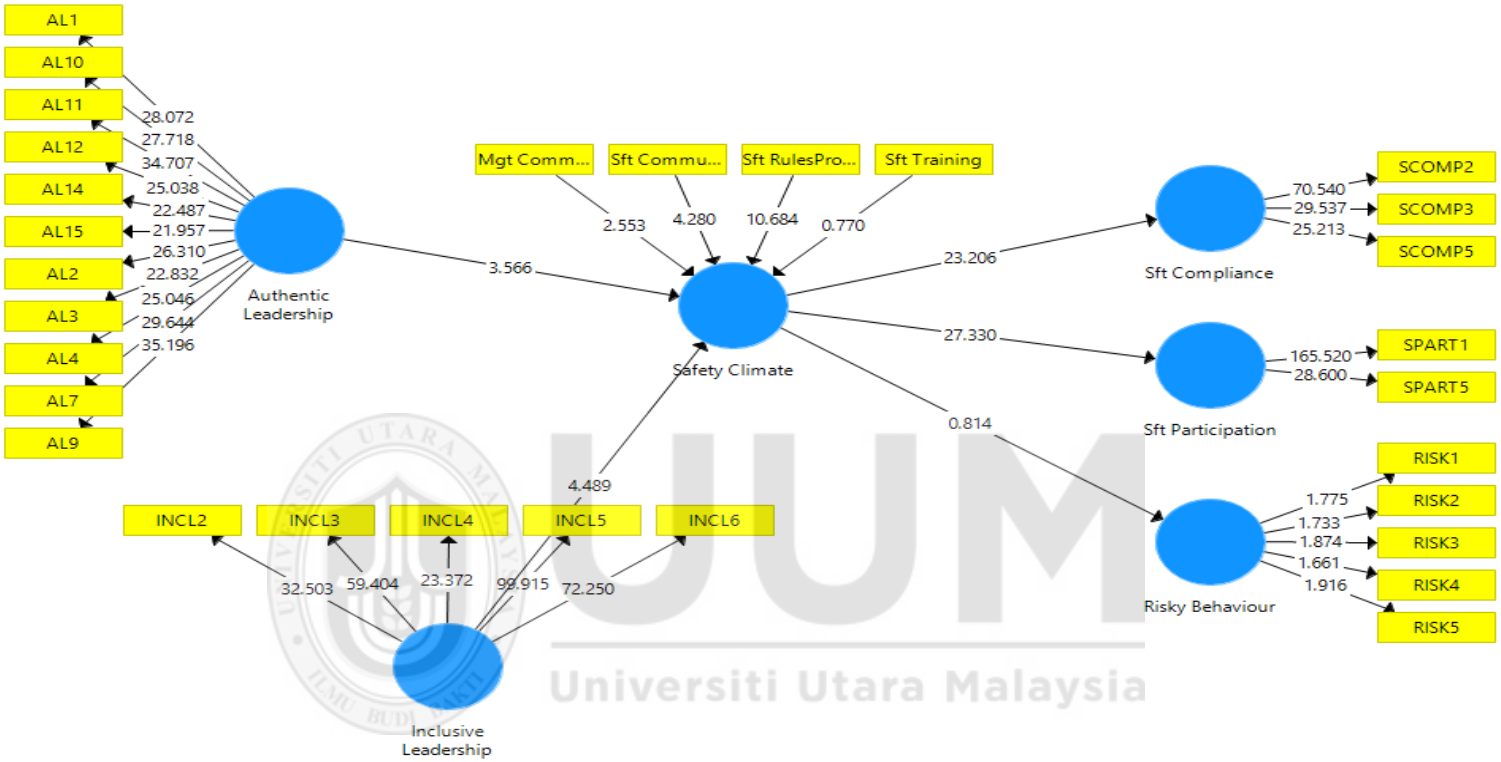
Number of Times involved in Workplace Accident

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	274	85.9	85.9	85.9
	6-10	45	14.1	14.1	100.0
	Total	319	100.0	100.0	

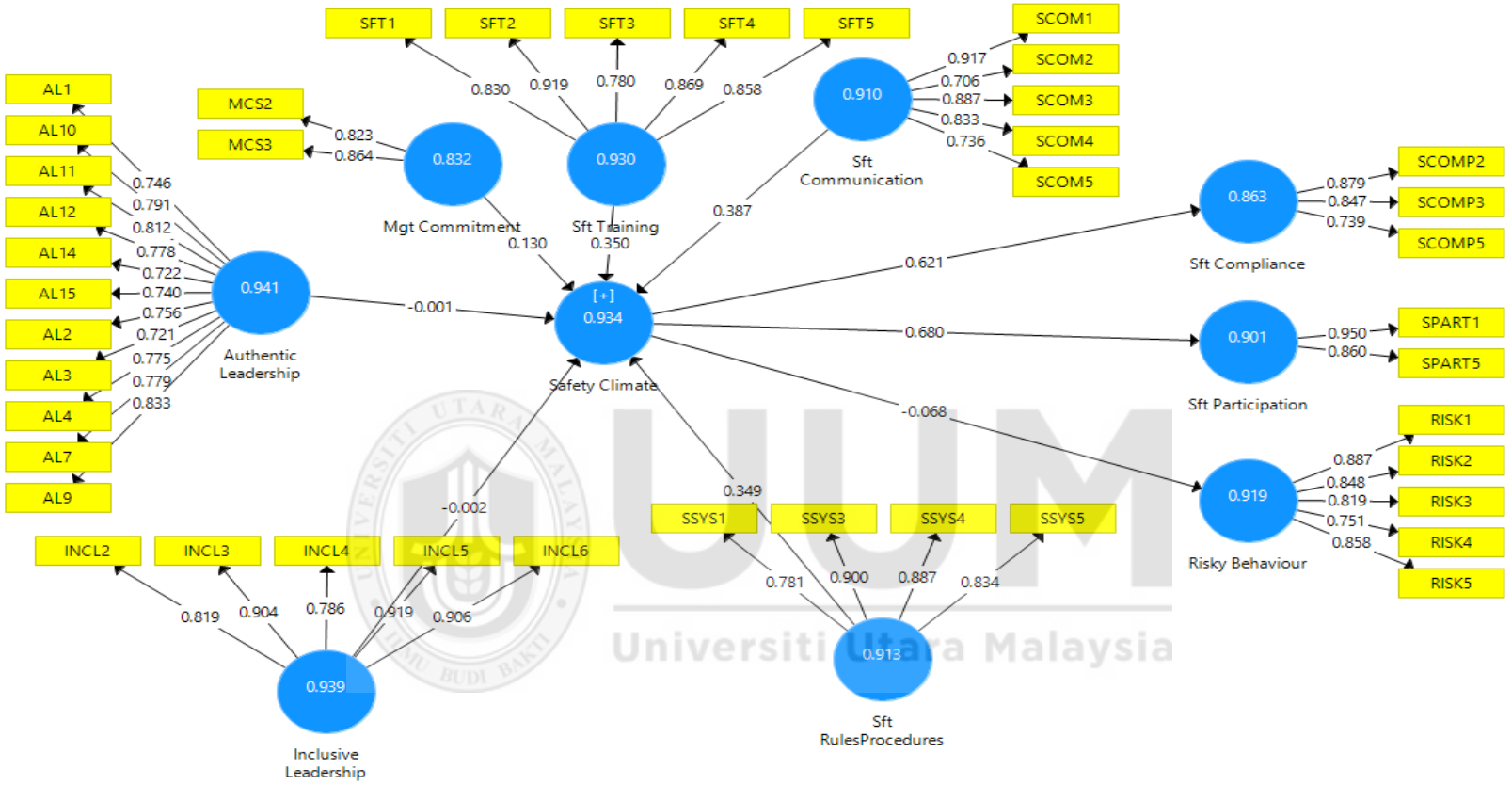
PLS OUTPUTS



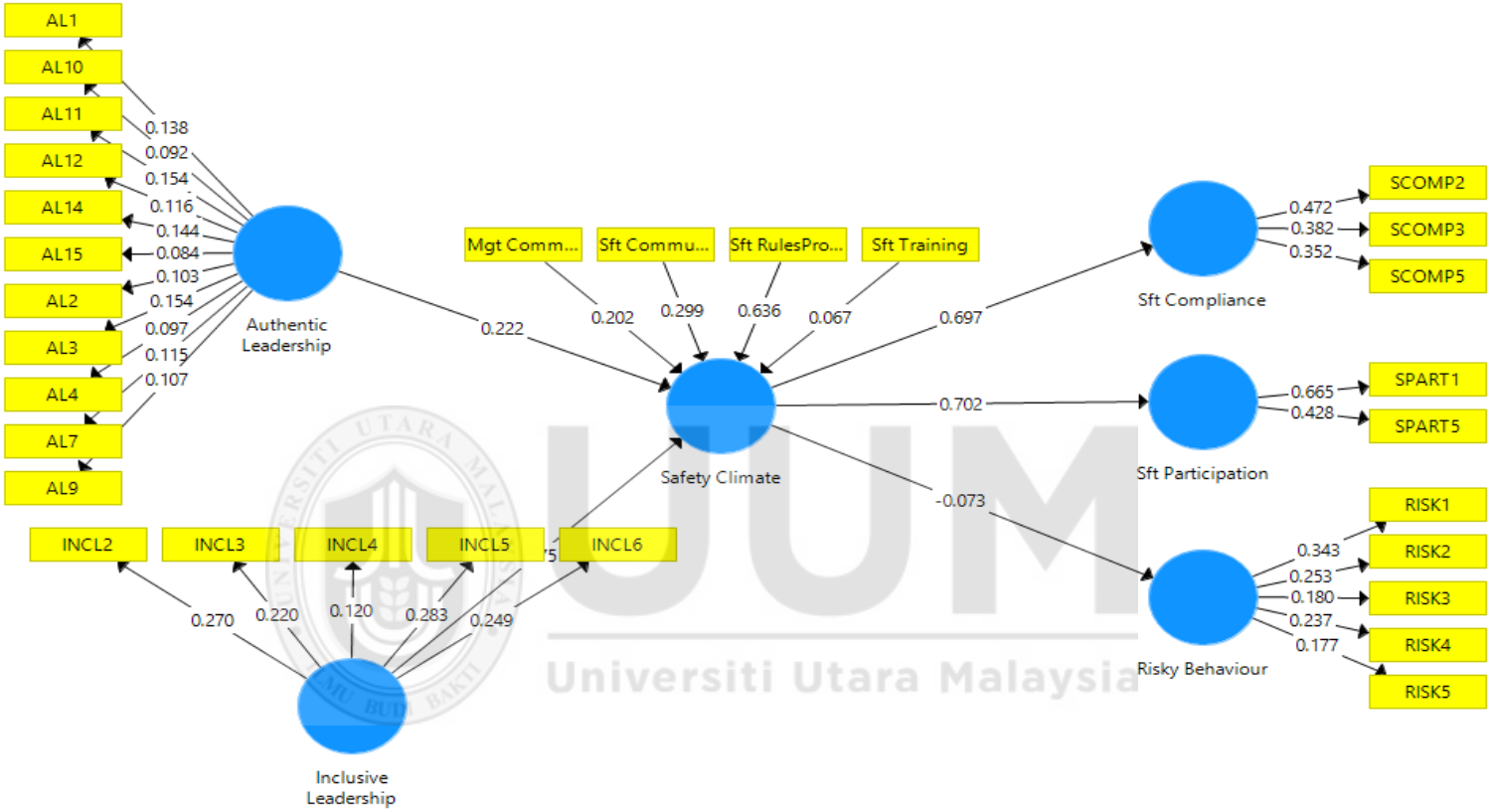
Average variance extracted



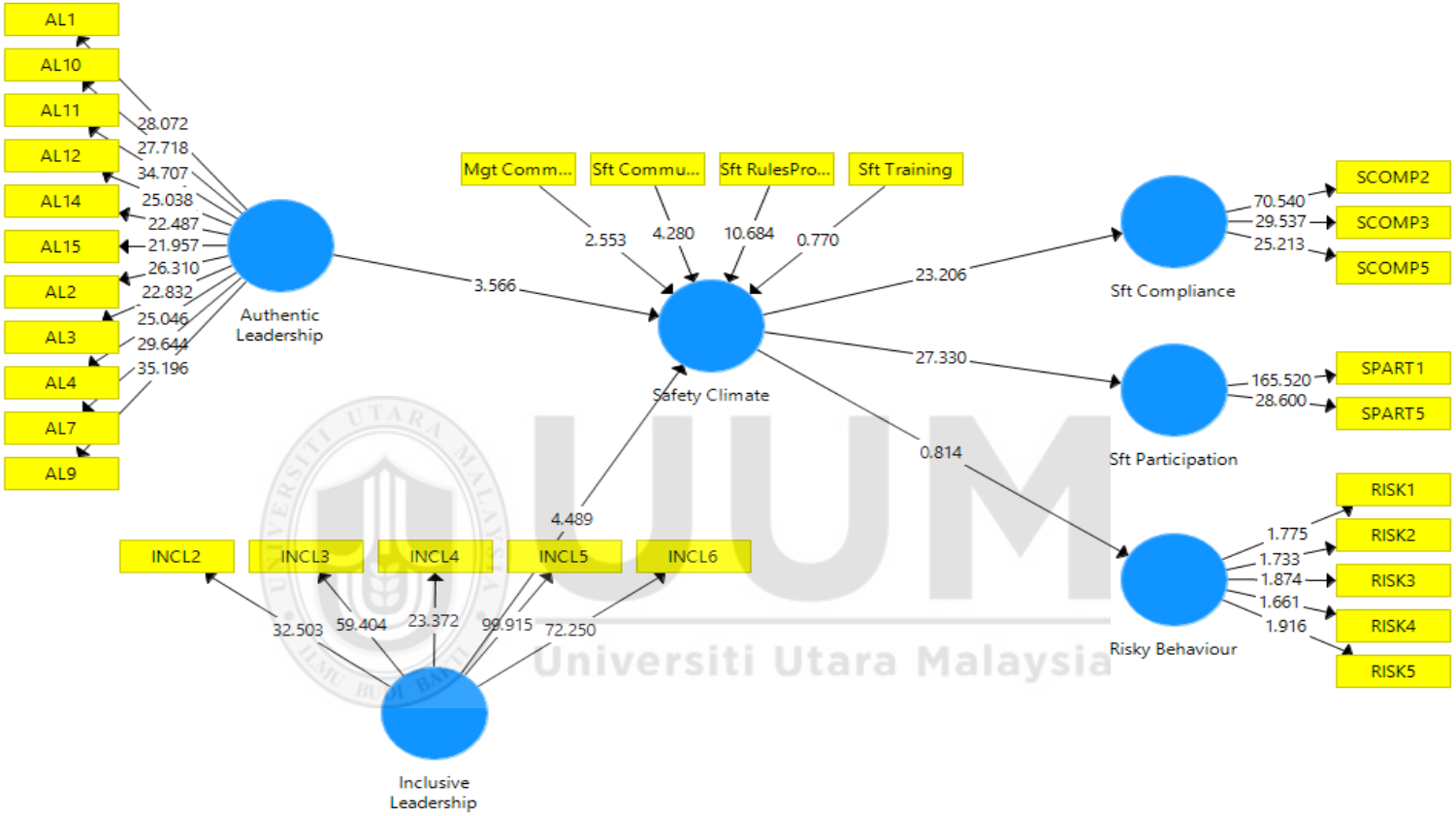
Bootstrap for hypotheses test



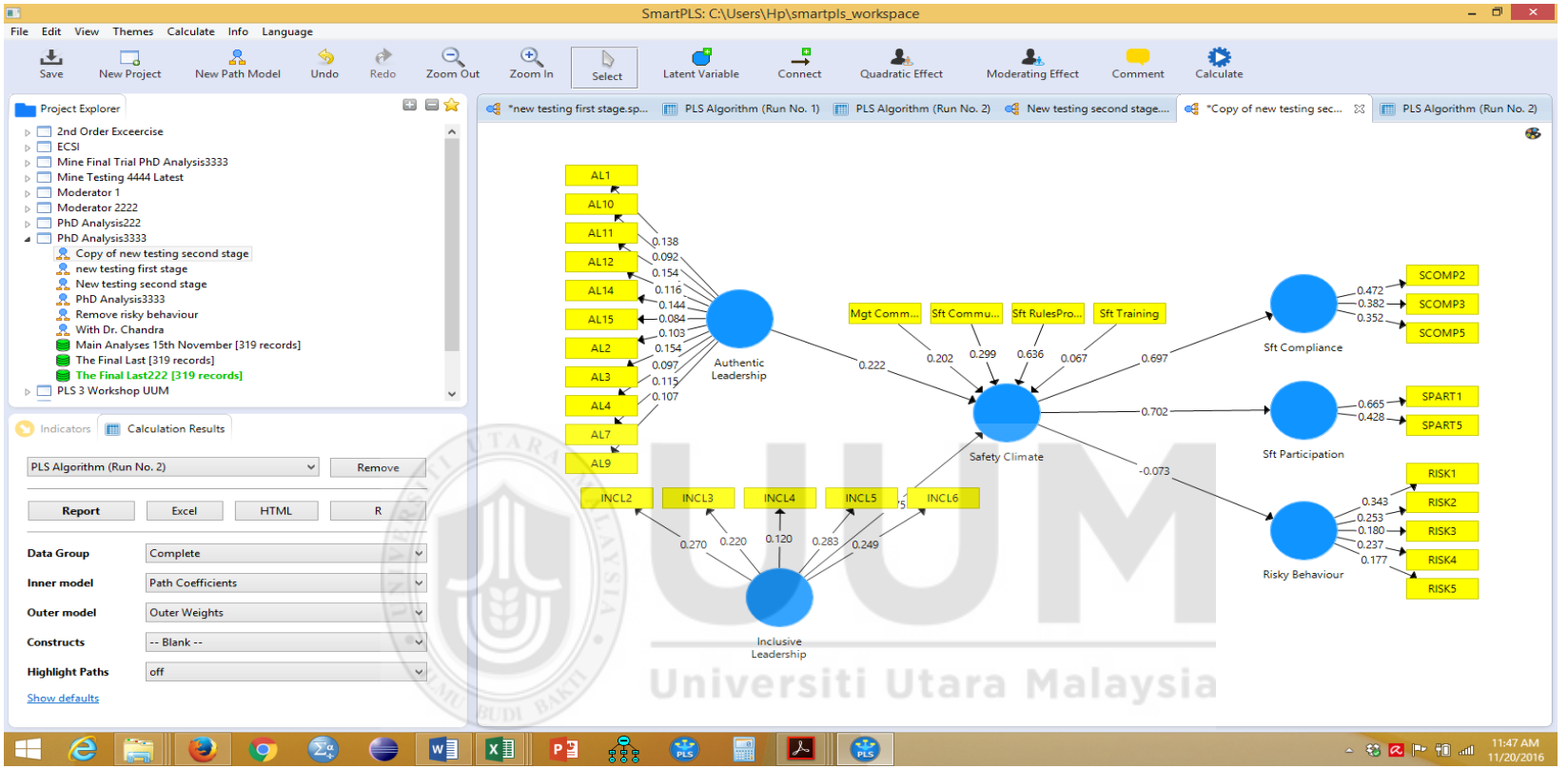
Composite reliability



Second stage model weights



Structural model



Second order stage model

Measurement and structural model outputs

	AL->SC->SComp	AL->SC->SP	AL->SC->RB	IL->SC->Scomp	IL->SC->SP	IL->SC->RB
Sample 1	0.158000	0.168889	-0.034331	0.190455	0.203580	-0.041383
Sample 2	0.087349	0.083683	0.006697	0.210329	0.201502	0.016126
Sample 3	0.155335	0.156263	-0.022823	0.186453	0.187567	-0.027395
Sample 4	0.119727	0.122172	0.012436	0.173240	0.176778	0.017995
Sample 5	0.174554	0.171805	0.020391	0.194183	0.191125	0.022684
Sample 6	0.174849	0.174548	-0.027376	0.184545	0.184227	-0.028894
Sample 7	0.195489	0.199841	-0.036786	0.152757	0.156158	-0.028745
Sample 8	0.215866	0.235922	-0.039385	0.124790	0.136384	-0.022768
Sample 9	0.066073	0.070904	-0.008609	0.313460	0.336379	-0.040845
Sample 10	0.091080	0.087251	-0.016335	0.212935	0.203983	-0.038189
Sample 11	0.066383	0.067126	0.005564	0.196968	0.199173	0.016511
Sample 12	0.102620	0.105982	-0.017526	0.240425	0.248302	-0.041061
Sample 13	0.195586	0.191741	-0.021284	0.186810	0.183137	-0.020329
Sample 14	0.171646	0.167482	-0.043915	0.164754	0.160757	-0.042151
Sample 15	0.078099	0.081118	-0.013073	0.274251	0.284850	-0.045906
Sample 16	0.174425	0.176676	0.032968	0.191924	0.194401	0.036275
Sample 17	0.163977	0.156910	0.013362	0.159934	0.153042	0.013033
Sample 18	0.193753	0.206847	-0.025890	0.187296	0.199953	-0.025027
Sample 19	0.130788	0.130562	-0.026925	0.204286	0.203932	-0.042056
Sample 20	0.127856	0.134748	-0.008261	0.207299	0.218474	-0.013394

Sample 21	0.119691	0.117722	0.023873	0.266076	0.261700	0.053070
Sample 22	0.113469	0.119925	-0.023669	0.214287	0.226480	-0.044699
Sample 23	0.164871	0.157207	-0.039062	0.191319	0.182425	-0.045328
Sample 24	0.146354	0.157415	-0.024092	0.226481	0.243599	-0.037283
Sample 25	0.113807	0.122962	-0.015817	0.180001	0.194482	-0.025016
Sample 26	0.179295	0.182457	-0.011570	0.169748	0.172742	-0.010954
Sample 27	0.121415	0.122137	-0.017428	0.195812	0.196976	-0.028106
Sample 28	0.226573	0.243272	-0.052043	0.160085	0.171883	-0.036771
Sample 29	0.102263	0.099104	-0.009698	0.158260	0.153370	-0.015009
Sample 30	0.179424	0.178516	-0.052923	0.155011	0.154227	-0.045722
Sample 31	0.137552	0.136883	-0.015492	0.181386	0.180504	-0.020429
Sample 32	0.186704	0.183699	-0.026923	0.182541	0.179604	-0.026323
Sample 33	0.123830	0.120974	0.011763	0.205639	0.200896	0.019534
Sample 34	0.059881	0.061469	-0.008856	0.268492	0.275612	-0.039710
Sample 35	0.110055	0.109183	0.012896	0.133918	0.132857	0.015692
Sample 36	0.070765	0.074839	0.014105	0.204229	0.215987	0.040707
Sample 37	0.009544	0.009486	-0.001364	0.286480	0.284736	-0.040934
Sample 38	0.175304	0.185437	-0.016395	0.211012	0.223210	-0.019735
Sample 39	0.113465	0.118250	-0.014114	0.198782	0.207165	-0.024727
Sample 40	0.139350	0.150987	0.035515	0.164305	0.178026	0.041875
Sample 41	0.152867	0.147343	-0.017614	0.197359	0.190227	-0.022741
Sample 42	0.218173	0.231081	-0.048041	0.169835	0.179883	-0.037397
Sample 43	0.083649	0.080267	-0.023125	0.288553	0.276884	-0.079772
Sample 44	0.210229	0.208887	-0.021377	0.193274	0.192040	-0.019653
Sample 45	0.144437	0.140657	-0.023749	0.183710	0.178902	-0.030206
Sample 46	0.162160	0.170933	-0.018700	0.192118	0.202512	-0.022154
Sample 47	0.170373	0.173387	-0.036187	0.196846	0.200328	-0.041809

Sample 48	0.179769	0.174743	-0.025803	0.219707	0.213564	-0.031536
Sample 49	0.162167	0.165205	-0.019060	0.187576	0.191090	-0.022046
Sample 50	0.222220	0.218534	-0.032122	0.115474	0.113558	-0.016692
Sample 51	0.185848	0.181051	-0.034193	0.155761	0.151741	-0.028657
Sample 52	0.138960	0.149574	-0.028231	0.204970	0.220627	-0.041641
Sample 53	0.130586	0.123630	-0.013966	0.178228	0.168734	-0.019061
Sample 54	0.068390	0.069629	-0.008835	0.237133	0.241428	-0.030635
Sample 55	0.124089	0.128958	-0.016747	0.195319	0.202983	-0.026360
Sample 56	0.129882	0.122333	-0.034027	0.196583	0.185158	-0.051502
Sample 57	0.201875	0.202047	-0.037584	0.185529	0.185687	-0.034540
Sample 58	0.134177	0.132942	-0.013648	0.135608	0.134359	-0.013794
Sample 59	0.139169	0.129858	-0.017442	0.138187	0.128941	-0.017318
Sample 60	0.123707	0.126738	-0.020322	0.186574	0.191145	-0.030649
Sample 61	0.047755	0.047198	-0.005568	0.228318	0.225653	-0.026620
Sample 62	0.066156	0.070556	-0.026020	0.265078	0.282708	-0.104260
Sample 63	0.191154	0.190233	-0.017626	0.193822	0.192888	-0.017872
Sample 64	0.226955	0.220353	-0.039147	0.195381	0.189697	-0.033701
Sample 65	0.168154	0.165256	-0.027100	0.153527	0.150882	-0.024743
Sample 66	0.203114	0.214076	-0.042167	0.165701	0.174644	-0.034400
Sample 67	0.136994	0.148516	0.025482	0.162157	0.175797	0.030162
Sample 68	0.209183	0.219566	-0.042904	0.179234	0.188130	-0.036761
Sample 69	0.131602	0.143823	0.015640	0.255799	0.279555	0.030400
Sample 70	0.113087	0.121938	-0.013716	0.194800	0.210046	-0.023627
Sample 71	0.199823	0.195919	-0.019503	0.148353	0.145455	-0.014480
Sample 72	0.145288	0.147839	-0.026170	0.286128	0.291153	-0.051539
Sample 73	0.150714	0.162246	-0.015368	0.238549	0.256802	-0.024324
Sample 74	0.169221	0.168835	-0.019590	0.180243	0.179832	-0.020866

Sample 75	0.123545	0.121592	-0.010012	0.216242	0.212824	-0.017525
Sample 76	0.195291	0.212840	-0.024320	0.169937	0.185208	-0.021162
Sample 77	0.140709	0.139883	-0.021967	0.175383	0.174353	-0.027381
Sample 78	0.191074	0.196883	-0.058958	0.177657	0.183058	-0.054818
Sample 79	0.186107	0.191856	-0.031823	0.169900	0.175148	-0.029051
Sample 80	0.235115	0.225676	-0.050060	0.084774	0.081371	-0.018050
Sample 81	0.116505	0.126001	-0.017901	0.255530	0.276356	-0.039261
Sample 82	0.144265	0.139498	-0.017786	0.174302	0.168542	-0.021489
Sample 83	0.161064	0.166262	-0.020407	0.182555	0.188445	-0.023129
Sample 84	0.105719	0.111615	-0.016227	0.174790	0.184538	-0.026828
Sample 85	0.144922	0.159311	-0.017434	0.231888	0.254912	-0.027897
Sample 86	0.131410	0.132349	-0.016960	0.239863	0.241577	-0.030957
Sample 87	0.158727	0.157641	-0.012590	0.166861	0.165720	-0.013235
Sample 88	0.152424	0.147252	-0.018534	0.213487	0.206244	-0.025958
Sample 89	0.147498	0.142572	-0.019628	0.172515	0.166754	-0.022957
Sample 90	0.118961	0.116705	-0.021099	0.226348	0.222056	-0.040145
Sample 91	0.175422	0.172738	-0.029020	0.210326	0.207108	-0.034795
Sample 92	0.083055	0.085491	-0.015145	0.218539	0.224949	-0.039849
Sample 93	0.158600	0.162174	-0.029543	0.278441	0.284716	-0.051866
Sample 94	0.227550	0.235538	-0.034398	0.167896	0.173790	-0.025380
Sample 95	0.101396	0.096966	-0.011047	0.181716	0.173778	-0.019798
Sample 96	0.167401	0.177964	0.043533	0.203405	0.216239	0.052895
Sample 97	0.151457	0.143897	0.013858	0.184336	0.175134	0.016867
Sample 98	0.099971	0.093548	-0.015213	0.165475	0.154843	-0.025181
Sample 99	0.210092	0.205984	-0.054063	0.168927	0.165623	-0.043470
Sample 100	0.141891	0.154924	-0.020308	0.268811	0.293503	-0.038473
Sample 101	0.174014	0.166449	-0.027495	0.206818	0.197827	-0.032678

Sample 102	0.132525	0.126679	0.013706	0.256843	0.245512	0.026564
Sample 103	0.114870	0.115842	-0.014208	0.228197	0.230128	-0.028225
Sample 104	0.234965	0.237883	-0.058562	0.161203	0.163205	-0.040177
Sample 105	0.233490	0.241607	-0.030572	0.186127	0.192598	-0.024371
Sample 106	0.110347	0.115898	-0.027155	0.214710	0.225510	-0.052838
Sample 107	0.156714	0.151146	-0.025384	0.208944	0.201521	-0.033844
Sample 108	0.115671	0.113279	-0.014760	0.210649	0.206291	-0.026879
Sample 109	0.119985	0.125185	0.014449	0.193686	0.202080	0.023325
Sample 110	0.162329	0.158322	-0.041629	0.195485	0.190660	-0.050132
Sample 111	0.217499	0.206936	-0.020964	0.154507	0.147003	-0.014892
Sample 112	0.163648	0.164659	-0.031730	0.194148	0.195348	-0.037644
Sample 113	0.149120	0.156748	0.018599	0.223832	0.235281	0.027917
Sample 114	0.165168	0.177134	0.020901	0.198377	0.212748	0.025104
Sample 115	0.186045	0.190225	-0.028715	0.158391	0.161949	-0.024446
Sample 116	0.183463	0.184837	-0.032007	0.135303	0.136317	-0.023605
Sample 117	0.138747	0.147779	-0.023467	0.199255	0.212225	-0.033700
Sample 118	0.146583	0.145425	-0.016922	0.241916	0.240006	-0.027928
Sample 119	0.190219	0.198482	0.029399	0.186761	0.194874	0.028864
Sample 120	0.070901	0.073505	-0.008707	0.295305	0.306154	-0.036266
Sample 121	0.100585	0.103989	-0.025708	0.233678	0.241587	-0.059726
Sample 122	0.203047	0.205172	0.012111	0.115312	0.116518	0.006878
Sample 123	0.128628	0.128574	-0.008515	0.143626	0.143566	-0.009508
Sample 124	0.214765	0.220135	-0.053866	0.210366	0.215626	-0.052763
Sample 125	0.214618	0.229461	-0.021204	0.155000	0.165720	-0.015314
Sample 126	0.085831	0.082428	-0.012538	0.256069	0.245916	-0.037405
Sample 127	0.204176	0.204769	-0.019673	0.198411	0.198988	-0.019117
Sample 128	0.077860	0.081585	-0.011415	0.208997	0.218996	-0.030641

Sample 129	0.159740	0.156143	-0.019740	0.183097	0.178974	-0.022627
Sample 130	0.155396	0.156183	-0.024581	0.177839	0.178740	-0.028131
Sample 131	0.156435	0.168745	0.018960	0.163355	0.176209	0.019799
Sample 132	0.172547	0.171195	-0.021599	0.222359	0.220617	-0.027834
Sample 133	0.186038	0.175621	0.019630	0.155159	0.146471	0.016372
Sample 134	0.191318	0.188123	-0.018300	0.179378	0.176382	-0.017158
Sample 135	0.203604	0.215879	-0.039325	0.118816	0.125980	-0.022949
Sample 136	0.176431	0.190131	0.009192	0.171469	0.184784	0.008934
Sample 137	0.194352	0.182670	-0.015701	0.148170	0.139264	-0.011970
Sample 138	0.206736	0.207171	-0.039705	0.175101	0.175470	-0.033629
Sample 139	0.132620	0.137133	-0.017792	0.222934	0.230520	-0.029908
Sample 140	0.210601	0.204391	-0.038060	0.136772	0.132739	-0.024717
Sample 141	0.211898	0.207735	0.021061	0.130744	0.128175	0.012995
Sample 142	0.211154	0.207016	-0.030569	0.123597	0.121176	-0.017894
Sample 143	0.173121	0.174348	-0.024003	0.134078	0.135029	-0.018590
Sample 144	0.121888	0.124166	-0.020217	0.264100	0.269037	-0.043805
Sample 145	0.246402	0.248106	-0.053631	0.156623	0.157706	-0.034090
Sample 146	0.172601	0.174065	-0.017152	0.230904	0.232864	-0.022946
Sample 147	0.145311	0.153835	-0.022896	0.197099	0.208661	-0.031056
Sample 148	0.142720	0.147587	-0.009502	0.239704	0.247877	-0.015960
Sample 149	0.169505	0.163715	-0.030474	0.221198	0.213642	-0.039768
Sample 150	0.172595	0.173396	-0.012357	0.247874	0.249024	-0.017747
Sample 151	0.072566	0.073928	-0.017264	0.267525	0.272546	-0.063646
Sample 152	0.152428	0.156495	-0.013844	0.170053	0.174589	-0.015444
Sample 153	0.217622	0.201307	-0.051181	0.145008	0.134137	-0.034104
Sample 154	0.134755	0.140568	-0.023076	0.213889	0.223116	-0.036627
Sample 155	0.142636	0.151316	0.017091	0.219729	0.233101	0.026329

Sample 156	0.143329	0.151371	-0.017364	0.236957	0.250251	-0.028706
Sample 157	0.191649	0.186426	0.029612	0.187505	0.182395	0.028972
Sample 158	0.163506	0.171814	-0.054249	0.235051	0.246995	-0.077987
Sample 159	0.086705	0.087507	-0.006981	0.225764	0.227851	-0.018178
Sample 160	0.205913	0.202548	-0.034915	0.125567	0.123515	-0.021292
Sample 161	0.118725	0.114215	0.008102	0.152392	0.146602	0.010399
Sample 162	0.146476	0.151432	0.010717	0.166773	0.172415	0.012202
Sample 163	0.183561	0.189669	-0.039843	0.216335	0.223534	-0.046957
Sample 164	0.147776	0.150533	0.013371	0.181961	0.185356	0.016464
Sample 165	0.214966	0.226718	0.021582	0.131101	0.138268	0.013162
Sample 166	0.079510	0.080253	-0.013620	0.207886	0.209829	-0.035611
Sample 167	0.174381	0.172554	0.028847	0.204352	0.202210	0.033805
Sample 168	0.148776	0.141742	-0.013665	0.164109	0.156350	-0.015073
Sample 169	0.113291	0.108950	-0.012533	0.198592	0.190983	-0.021969
Sample 170	0.091994	0.088970	-0.005473	0.207373	0.200556	-0.012337
Sample 171	0.123573	0.130941	-0.020152	0.232947	0.246837	-0.037988
Sample 172	0.159518	0.170868	-0.035858	0.224914	0.240917	-0.050558
Sample 173	0.189001	0.180023	-0.026754	0.189500	0.180498	-0.026824
Sample 174	0.140090	0.143465	0.014437	0.180359	0.184704	0.018587
Sample 175	0.205064	0.209949	-0.045588	0.142421	0.145813	-0.031662
Sample 176	0.186882	0.197997	-0.034785	0.134957	0.142984	-0.025120
Sample 177	0.230195	0.225946	-0.030415	0.131772	0.129339	-0.017411
Sample 178	0.131119	0.141117	-0.024556	0.255152	0.274605	-0.047786
Sample 179	0.226118	0.223921	-0.040184	0.134960	0.133649	-0.023984
Sample 180	0.166867	0.174077	-0.045343	0.186310	0.194361	-0.050627
Sample 181	0.125182	0.135531	-0.016001	0.206271	0.223323	-0.026366
Sample 182	0.074875	0.080756	-0.012980	0.339635	0.366314	-0.058879

Sample 183	0.134738	0.147714	0.027070	0.164949	0.180834	0.033140
Sample 184	0.172395	0.173137	-0.028831	0.210438	0.211344	-0.035193
Sample 185	0.137179	0.136148	-0.034274	0.285455	0.283309	-0.071321
Sample 186	0.172496	0.170017	-0.023582	0.128677	0.126828	-0.017592
Sample 187	0.166141	0.160102	-0.027651	0.150282	0.144819	-0.025012
Sample 188	0.187664	0.202280	0.016340	0.170479	0.183756	0.014844
Sample 189	0.140796	0.151581	0.009223	0.238375	0.256634	0.015614
Sample 190	0.168171	0.174162	-0.019565	0.141695	0.146743	-0.016485
Sample 191	0.148976	0.153424	-0.028574	0.201206	0.207213	-0.038592
Sample 192	0.071554	0.071376	0.006375	0.266577	0.265913	0.023750
Sample 193	0.161017	0.162908	-0.051883	0.150918	0.152690	-0.048629
Sample 194	0.183975	0.175526	-0.016037	0.108168	0.103200	-0.009429
Sample 195	0.131704	0.135179	0.028480	0.236464	0.242704	0.051133
Sample 196	0.233287	0.231854	-0.016837	0.160679	0.159693	-0.011597
Sample 197	0.065867	0.065061	-0.009807	0.258513	0.255350	-0.038489
Sample 198	0.109712	0.101026	0.005688	0.138365	0.127411	0.007174
Sample 199	0.113205	0.108582	-0.019197	0.219578	0.210611	-0.037235
Sample 200	0.185899	0.178641	0.013974	0.175043	0.168209	0.013157
Sample 201	0.233160	0.250766	-0.028154	0.185956	0.199998	-0.022454
Sample 202	0.209401	0.206040	-0.024047	0.120009	0.118083	-0.013781
Sample 203	0.097794	0.100812	-0.013267	0.260804	0.268853	-0.035381
Sample 204	0.234852	0.238388	-0.027385	0.141019	0.143142	-0.016443
Sample 205	0.176306	0.181610	-0.025821	0.203755	0.209884	-0.029841
Sample 206	0.113836	0.111604	0.011972	0.252342	0.247394	0.026538
Sample 207	0.104541	0.105018	-0.010699	0.232835	0.233897	-0.023828
Sample 208	0.187762	0.193026	0.033047	0.185096	0.190285	0.032578
Sample 209	0.177104	0.175083	-0.009321	0.180736	0.178673	-0.009513

Sample 210	0.157020	0.153498	0.017942	0.134845	0.131820	0.015408
Sample 211	0.151615	0.146840	-0.014606	0.207138	0.200614	-0.019955
Sample 212	0.222294	0.220176	-0.012211	0.211291	0.209278	-0.011607
Sample 213	0.143595	0.136851	-0.022220	0.187491	0.178686	-0.029012
Sample 214	0.149009	0.151625	-0.034633	0.218354	0.222189	-0.050750
Sample 215	0.182225	0.170946	-0.029567	0.165491	0.155248	-0.026852
Sample 216	0.109520	0.116943	0.024752	0.216033	0.230676	0.048825
Sample 217	0.140341	0.153295	0.026931	0.196788	0.214953	0.037763
Sample 218	0.148036	0.143165	-0.030048	0.135990	0.131516	-0.027603
Sample 219	0.247338	0.243735	-0.042009	0.177177	0.174596	-0.030093
Sample 220	0.127927	0.131779	-0.022320	0.250593	0.258139	-0.043722
Sample 221	0.193748	0.198058	0.017929	0.208520	0.213158	0.019295
Sample 222	0.216742	0.219211	-0.030014	0.170676	0.172621	-0.023635
Sample 223	0.160634	0.159191	-0.020549	0.109352	0.108370	-0.013989
Sample 224	0.158957	0.170906	-0.027523	0.190139	0.204433	-0.032922
Sample 225	0.146291	0.155493	-0.022269	0.209790	0.222987	-0.031936
Sample 226	0.209535	0.214317	-0.045803	0.185729	0.189967	-0.040599
Sample 227	0.215917	0.212756	0.046341	0.130992	0.129074	0.028114
Sample 228	0.194867	0.203057	-0.040121	0.190032	0.198019	-0.039126
Sample 229	0.213280	0.214912	-0.050832	0.188518	0.189960	-0.044930
Sample 230	0.165114	0.169778	-0.032269	0.186256	0.191517	-0.036401
Sample 231	0.184968	0.182072	-0.038321	0.190924	0.187936	-0.039555
Sample 232	0.110670	0.109572	-0.016471	0.261153	0.258564	-0.038867
Sample 233	0.120899	0.115306	-0.012105	0.215763	0.205783	-0.021603
Sample 234	0.147556	0.144594	-0.012121	0.206624	0.202476	-0.016973
Sample 235	0.131148	0.130852	-0.008497	0.195156	0.194714	-0.012643
Sample 236	0.121666	0.119194	0.013917	0.184624	0.180874	0.021119

Sample 237	0.168756	0.169565	0.021136	0.160597	0.161367	0.020114
Sample 238	0.180464	0.167995	-0.034211	0.134599	0.125299	-0.025516
Sample 239	0.184231	0.180640	0.018579	0.197369	0.193522	0.019904
Sample 240	0.157129	0.156351	-0.023689	0.238557	0.237375	-0.035966
Sample 241	0.108634	0.105032	-0.015388	0.217295	0.210090	-0.030780
Sample 242	0.167821	0.166442	-0.031528	0.228083	0.226210	-0.042850
Sample 243	0.097053	0.096398	0.004727	0.231692	0.230129	0.011286
Sample 244	0.054058	0.052404	0.006899	0.224433	0.217564	0.028644
Sample 245	0.171594	0.180888	-0.026600	0.171167	0.180438	-0.026533
Sample 246	0.157394	0.156819	-0.025186	0.179712	0.179056	-0.028757
Sample 247	0.172071	0.192055	-0.020515	0.200350	0.223618	-0.023886
Sample 248	0.150597	0.157977	-0.012127	0.200605	0.210436	-0.016154
Sample 249	0.063649	0.061219	0.003630	0.280220	0.269519	0.015983
Sample 250	0.150381	0.151119	0.012890	0.202761	0.203756	0.017380
Sample 251	0.182372	0.196538	-0.045384	0.201426	0.217072	-0.050125
Sample 252	0.191801	0.194080	0.020438	0.199596	0.201968	0.021268
Sample 253	0.169520	0.173943	-0.035696	0.191271	0.196263	-0.040276
Sample 254	0.152191	0.150849	-0.012063	0.194596	0.192881	-0.015424
Sample 255	0.238214	0.249515	-0.051171	0.151557	0.158746	-0.032556
Sample 256	0.144436	0.154034	-0.023245	0.220620	0.235282	-0.035506
Sample 257	0.114573	0.112278	-0.020206	0.235094	0.230384	-0.041461
Sample 258	0.198576	0.199958	-0.021692	0.175703	0.176926	-0.019193
Sample 259	0.124501	0.125066	-0.012408	0.237760	0.238840	-0.023695
Sample 260	0.180861	0.181664	-0.022368	0.183972	0.184789	-0.022752
Sample 261	0.211365	0.219354	-0.026784	0.161251	0.167346	-0.020434
Sample 262	0.197406	0.196264	-0.024872	0.191360	0.190253	-0.024111
Sample 263	0.109166	0.102708	-0.024883	0.202855	0.190854	-0.046239

Sample 264	0.219933	0.225835	0.024217	0.103651	0.106432	0.011413
Sample 265	0.153899	0.150414	0.025100	0.245387	0.239831	0.040021
Sample 266	0.170575	0.166279	-0.021546	0.159145	0.155137	-0.020102
Sample 267	0.096792	0.094302	-0.008895	0.222632	0.216905	-0.020460
Sample 268	0.232721	0.232527	-0.036193	0.177350	0.177202	-0.027581
Sample 269	0.193160	0.195421	-0.030964	0.122497	0.123930	-0.019637
Sample 270	0.181146	0.184984	-0.044289	0.172934	0.176598	-0.042282
Sample 271	0.127750	0.129173	-0.016716	0.221056	0.223518	-0.028925
Sample 272	0.206728	0.204253	-0.021489	0.087843	0.086791	-0.009131
Sample 273	0.139509	0.139428	-0.018288	0.246249	0.246105	-0.032280
Sample 274	0.160823	0.162942	-0.013937	0.148844	0.150805	-0.012899
Sample 275	0.177756	0.186613	0.020424	0.191563	0.201107	0.022010
Sample 276	0.102081	0.104613	0.020873	0.187804	0.192462	0.038402
Sample 277	0.146392	0.145564	-0.018484	0.189461	0.188389	-0.023922
Sample 278	0.188985	0.199770	-0.036733	0.165766	0.175226	-0.032220
Sample 279	0.250967	0.239950	-0.039584	0.151112	0.144479	-0.023834
Sample 280	0.120384	0.123685	-0.020402	0.157909	0.162239	-0.026761
Sample 281	0.225247	0.235934	-0.042405	0.118717	0.124350	-0.022350
Sample 282	0.200050	0.204720	-0.038814	0.167248	0.171153	-0.032450
Sample 283	0.191361	0.188440	0.027286	0.180154	0.177404	0.025688
Sample 284	0.163153	0.169910	0.011581	0.166926	0.173840	0.011849
Sample 285	0.025329	0.025557	0.002976	0.266063	0.268456	0.031259
Sample 286	0.113682	0.117476	-0.010986	0.184426	0.190581	-0.017822
Sample 287	0.114180	0.121172	-0.009797	0.249027	0.264277	-0.021368
Sample 288	0.123003	0.121260	-0.024555	0.200878	0.198032	-0.040101
Sample 289	0.245239	0.243723	-0.029975	0.103345	0.102706	-0.012632
Sample 290	0.167906	0.170511	-0.023338	0.153462	0.155844	-0.021331

Sample 291	0.124349	0.122857	-0.023205	0.233826	0.231020	-0.043635
Sample 292	0.213860	0.221939	-0.024523	0.140754	0.146071	-0.016140
Sample 293	0.176443	0.172417	-0.023733	0.222689	0.217607	-0.029954
Sample 294	0.145871	0.145315	-0.021328	0.194179	0.193438	-0.028392
Sample 295	0.195056	0.217054	-0.033386	0.115314	0.128319	-0.019737
Sample 296	0.170183	0.167938	-0.033119	0.139451	0.137611	-0.027138
Sample 297	0.178435	0.165553	-0.029654	0.138500	0.128501	-0.023017
Sample 298	0.086015	0.089089	-0.011673	0.246942	0.255767	-0.033511
Sample 299	0.131655	0.136569	-0.009981	0.198312	0.205714	-0.015034
Sample 300	0.160992	0.166868	-0.034245	0.191175	0.198153	-0.040665
Sample 301	0.191812	0.191933	-0.031001	0.151485	0.151581	-0.024484
Sample 302	0.183474	0.187462	-0.025502	0.200004	0.204350	-0.027799
Sample 303	0.185286	0.183004	-0.017059	0.207527	0.204970	-0.019106
Sample 304	0.100630	0.094459	-0.012070	0.204085	0.191572	-0.024478
Sample 305	0.134176	0.143769	-0.012950	0.239891	0.257042	-0.023153
Sample 306	0.196949	0.200971	-0.046921	0.196751	0.200769	-0.046874
Sample 307	0.196636	0.194908	-0.044004	0.221261	0.219317	-0.049515
Sample 308	0.209335	0.203007	-0.029742	0.231455	0.224458	-0.032884
Sample 309	0.116948	0.111306	-0.015344	0.201310	0.191597	-0.026413
Sample 310	0.114953	0.112740	0.008858	0.190280	0.186616	0.014663
Sample 311	0.146218	0.160579	-0.029826	0.252141	0.276905	-0.051433
Sample 312	0.081397	0.074871	-0.011485	0.241671	0.222297	-0.034100
Sample 313	0.165167	0.163259	-0.021954	0.226859	0.224239	-0.030154
Sample 314	0.173624	0.162456	-0.014508	0.173101	0.161967	-0.014464
Sample 315	0.127715	0.122922	0.009811	0.208297	0.200480	0.016001
Sample 316	0.203779	0.195202	-0.046140	0.158479	0.151810	-0.035883
Sample 317	0.122495	0.130900	-0.020663	0.248610	0.265668	-0.041936

Sample 318	0.090452	0.089427	0.013864	0.202493	0.200199	0.031037
Sample 319	0.187046	0.187720	-0.017785	0.076641	0.076917	-0.007287
Sample 320	0.131677	0.130820	-0.013224	0.223290	0.221836	-0.022424
Sample 321	0.131606	0.141770	-0.022390	0.194617	0.209648	-0.033110
Sample 322	0.120589	0.123167	-0.019802	0.235484	0.240518	-0.038668
Sample 323	0.089759	0.085739	-0.009955	0.239040	0.228332	-0.026511
Sample 324	0.161749	0.161766	-0.031088	0.201831	0.201852	-0.038792
Sample 325	0.189721	0.187443	-0.027404	0.207201	0.204712	-0.029929
Sample 326	0.153961	0.164310	0.010204	0.121690	0.129870	0.008065
Sample 327	0.143399	0.152925	0.032652	0.217500	0.231948	0.049524
Sample 328	0.096618	0.094718	-0.025438	0.270572	0.265251	-0.071238
Sample 329	0.147630	0.144781	-0.025141	0.235305	0.230765	-0.040071
Sample 330	0.139240	0.136061	-0.016318	0.206126	0.201421	-0.024156
Sample 331	0.176832	0.190699	-0.032130	0.151780	0.163682	-0.027578
Sample 332	0.228172	0.229406	-0.013741	0.138871	0.139621	-0.008363
Sample 333	0.188781	0.194307	-0.020641	0.230597	0.237347	-0.025213
Sample 334	0.133212	0.133997	-0.017164	0.177426	0.178472	-0.022861
Sample 335	0.128290	0.126147	-0.011475	0.174500	0.171585	-0.015609
Sample 336	0.143462	0.146871	-0.017020	0.194928	0.199560	-0.023126
Sample 337	0.077824	0.082921	-0.011075	0.202426	0.215683	-0.028807
Sample 338	0.172045	0.187895	-0.023109	0.180726	0.197375	-0.024275
Sample 339	0.191780	0.191494	0.039757	0.174992	0.174731	0.036277
Sample 340	0.148088	0.143004	-0.023717	0.163179	0.157577	-0.026134
Sample 341	0.099766	0.096794	-0.016445	0.201876	0.195861	-0.033277
Sample 342	0.207554	0.211907	-0.036351	0.187528	0.191461	-0.032844
Sample 343	0.148616	0.153992	-0.035535	0.231906	0.240295	-0.055451
Sample 344	0.215711	0.228855	-0.079471	0.211533	0.224421	-0.077932

Sample 345	0.155217	0.168637	-0.032835	0.187893	0.204138	-0.039747
Sample 346	0.098442	0.098241	-0.014445	0.272568	0.272012	-0.039995
Sample 347	0.218272	0.229762	-0.029670	0.118641	0.124887	-0.016127
Sample 348	0.206763	0.196402	-0.023130	0.141563	0.134469	-0.015836
Sample 349	0.210149	0.218218	-0.037736	0.173269	0.179923	-0.031114
Sample 350	0.170714	0.171231	0.009367	0.185244	0.185805	0.010164
Sample 351	0.215482	0.205230	0.035519	0.071416	0.068018	0.011772
Sample 352	0.182931	0.178915	-0.017915	0.188300	0.184166	-0.018441
Sample 353	0.210071	0.214945	0.029122	0.118178	0.120920	0.016383
Sample 354	0.187702	0.192996	-0.031384	0.163525	0.168137	-0.027341
Sample 355	0.201313	0.208989	-0.030942	0.167025	0.173394	-0.025672
Sample 356	0.168673	0.175914	-0.037666	0.231743	0.241692	-0.051751
Sample 357	0.143768	0.133725	0.009175	0.124298	0.115615	0.007932
Sample 358	0.191426	0.189874	-0.030147	0.138636	0.137512	-0.021833
Sample 359	0.227878	0.231633	-0.044491	0.207679	0.211102	-0.040547
Sample 360	0.148161	0.152710	-0.010351	0.225180	0.232095	-0.015731
Sample 361	0.137659	0.135085	-0.019739	0.190569	0.187005	-0.027326
Sample 362	0.150411	0.154265	-0.024993	0.166161	0.170419	-0.027610
Sample 363	0.190261	0.178555	-0.018276	0.182025	0.170826	-0.017485
Sample 364	0.185181	0.194159	-0.048664	0.208434	0.218539	-0.054775
Sample 365	0.146007	0.149311	-0.021268	0.202246	0.206823	-0.029460
Sample 366	0.203349	0.203548	-0.039066	0.117254	0.117369	-0.022526
Sample 367	0.134611	0.130436	-0.010941	0.171605	0.166283	-0.013948
Sample 368	0.168112	0.177608	-0.017854	0.142139	0.150168	-0.015096
Sample 369	0.141913	0.151548	-0.019757	0.209544	0.223770	-0.029173
Sample 370	0.174504	0.172757	-0.040142	0.222149	0.219924	-0.051102
Sample 371	0.102155	0.105227	-0.020345	0.165872	0.170861	-0.033034

Sample 372	0.217449	0.211559	-0.027974	0.152115	0.147995	-0.019569
Sample 373	0.139911	0.138565	-0.036973	0.180844	0.179104	-0.047790
Sample 374	0.197029	0.202816	-0.026902	0.217231	0.223612	-0.029660
Sample 375	0.148244	0.137929	-0.017668	0.201128	0.187133	-0.023971
Sample 376	0.189229	0.183091	-0.021859	0.130960	0.126712	-0.015128
Sample 377	0.177390	0.180493	-0.019882	0.167186	0.170110	-0.018739
Sample 378	0.193402	0.198098	-0.031031	0.154484	0.158236	-0.024786
Sample 379	0.164018	0.165745	-0.036749	0.212422	0.214658	-0.047594
Sample 380	0.172656	0.186441	-0.016372	0.224079	0.241970	-0.021248
Sample 381	0.109588	0.115496	-0.017104	0.196184	0.206760	-0.030619
Sample 382	0.125772	0.125367	-0.014060	0.268308	0.267444	-0.029994
Sample 383	0.254265	0.261286	-0.025342	0.106900	0.109852	-0.010654
Sample 384	0.089259	0.085419	0.007342	0.152569	0.146006	0.012549
Sample 385	0.185276	0.187866	-0.027525	0.167251	0.169589	-0.024847
Sample 386	0.169888	0.172410	-0.017442	0.214419	0.217602	-0.022014
Sample 387	0.135821	0.139566	-0.018507	0.204782	0.210428	-0.027903
Sample 388	0.189025	0.209746	-0.027023	0.182581	0.202595	-0.026102
Sample 389	0.174011	0.178330	-0.025744	0.241049	0.247033	-0.035662
Sample 390	0.171409	0.172269	0.021231	0.160143	0.160946	0.019835
Sample 391	0.148102	0.144109	-0.029502	0.185848	0.180837	-0.037020
Sample 392	0.191734	0.187131	-0.020517	0.156151	0.152402	-0.016710
Sample 393	0.134179	0.142279	-0.021498	0.225922	0.239559	-0.036197
Sample 394	0.154367	0.161088	-0.030775	0.219620	0.229183	-0.043784
Sample 395	0.175632	0.182305	0.025529	0.179986	0.186825	0.026162
Sample 396	0.171354	0.172164	-0.022044	0.185055	0.185929	-0.023806
Sample 397	0.148815	0.147987	-0.025063	0.240626	0.239286	-0.040525
Sample 398	0.176398	0.175725	-0.037888	0.180471	0.179782	-0.038763

Sample 399	0.188236	0.195556	-0.023932	0.135918	0.141204	-0.017280
Sample 400	0.180011	0.188770	-0.023679	0.192943	0.202332	-0.025380
Sample 401	0.146907	0.153671	-0.022182	0.228562	0.239086	-0.034511
Sample 402	0.144327	0.141344	-0.026231	0.160513	0.157194	-0.029172
Sample 403	0.192059	0.199183	-0.025027	0.263336	0.273105	-0.034315
Sample 404	0.142282	0.144935	-0.027612	0.169334	0.172491	-0.032862
Sample 405	0.164178	0.164710	-0.017545	0.164975	0.165509	-0.017630
Sample 406	0.096921	0.099838	-0.011926	0.293809	0.302653	-0.036154
Sample 407	0.092745	0.088768	-0.019727	0.217944	0.208600	-0.046358
Sample 408	0.136036	0.138997	-0.034657	0.239595	0.244811	-0.061040
Sample 409	0.092922	0.093823	-0.021212	0.234600	0.236876	-0.053554
Sample 410	0.141532	0.142231	-0.026273	0.203480	0.204485	-0.037773
Sample 411	0.169411	0.180582	-0.036352	0.179895	0.191757	-0.038601
Sample 412	0.150965	0.147188	-0.019737	0.215352	0.209965	-0.028155
Sample 413	0.207090	0.205633	-0.021425	0.138709	0.137733	-0.014350
Sample 414	0.246442	0.241633	-0.043410	0.133875	0.131263	-0.023581
Sample 415	0.189938	0.180284	-0.036059	0.107942	0.102455	-0.020492
Sample 416	0.170621	0.172449	-0.015526	0.177933	0.179839	-0.016192
Sample 417	0.067685	0.068191	-0.009257	0.222888	0.224554	-0.030484
Sample 418	0.135758	0.130246	0.015064	0.161015	0.154478	0.017867
Sample 419	0.223009	0.220212	-0.053857	0.140664	0.138900	-0.033971
Sample 420	0.178365	0.182705	-0.032302	0.218601	0.223921	-0.039589
Sample 421	0.224910	0.225308	-0.038262	0.156766	0.157043	-0.026669
Sample 422	0.165493	0.182505	0.018145	0.163399	0.180196	0.017915
Sample 423	0.208377	0.211057	-0.022742	0.186013	0.188406	-0.020301
Sample 424	0.157899	0.166875	-0.017993	0.179644	0.189855	-0.020471
Sample 425	0.215716	0.215671	-0.027251	0.132420	0.132392	-0.016728

Sample 426	0.110652	0.104869	0.008611	0.220911	0.209367	0.017192
Sample 427	0.238365	0.251730	-0.044232	0.156661	0.165445	-0.029071
Sample 428	0.229316	0.239172	-0.045078	0.159578	0.166437	-0.031369
Sample 429	0.238995	0.243343	-0.056618	0.163314	0.166285	-0.038689
Sample 430	0.219595	0.221211	-0.033002	0.147609	0.148695	-0.022184
Sample 431	0.086653	0.083878	-0.011748	0.255559	0.247376	-0.034648
Sample 432	0.136490	0.141093	-0.017037	0.181907	0.188040	-0.022706
Sample 433	0.189571	0.205314	-0.028129	0.214517	0.232332	-0.031831
Sample 434	0.161391	0.171214	-0.040119	0.208278	0.220954	-0.051774
Sample 435	0.152641	0.151723	-0.029435	0.228929	0.227553	-0.044147
Sample 436	0.138698	0.135987	-0.020543	0.243533	0.238774	-0.036071
Sample 437	0.181762	0.179759	-0.030202	0.161112	0.159336	-0.026771
Sample 438	0.138824	0.135068	-0.021910	0.163440	0.159018	-0.025795
Sample 439	0.038727	0.039068	0.005800	0.247387	0.249566	0.037047
Sample 440	0.005970	0.006099	-0.000496	0.345711	0.353168	-0.028709
Sample 441	0.112990	0.108566	-0.008889	0.246716	0.237056	-0.019409
Sample 442	0.191664	0.204669	-0.030114	0.208474	0.222620	-0.032755
Sample 443	0.191294	0.187977	0.037699	0.168987	0.166057	0.033303
Sample 444	0.093684	0.095577	-0.007358	0.230728	0.235390	-0.018122
Sample 445	0.150933	0.164472	-0.008734	0.240504	0.262078	-0.013916
Sample 446	0.219797	0.216223	-0.058926	0.166223	0.163520	-0.044563
Sample 447	0.190044	0.187032	0.022090	0.132995	0.130887	0.015459
Sample 448	0.111916	0.104135	-0.020165	0.168597	0.156875	-0.030377
Sample 449	0.210155	0.205530	-0.049695	0.174306	0.170470	-0.041218
Sample 450	0.114771	0.115448	-0.017162	0.224078	0.225400	-0.033506
Sample 451	0.219300	0.206165	0.049635	0.087936	0.082669	0.019903
Sample 452	0.199453	0.208276	-0.029722	0.205029	0.214098	-0.030553

Sample 453	0.149579	0.142525	-0.033222	0.204631	0.194982	-0.045449
Sample 454	0.156706	0.159112	-0.023915	0.171647	0.174282	-0.026195
Sample 455	0.086464	0.085804	0.010556	0.152131	0.150969	0.018573
Sample 456	0.129824	0.126370	-0.025278	0.192433	0.187314	-0.037469
Sample 457	0.136956	0.136222	-0.014065	0.212344	0.211206	-0.021807
Sample 458	0.264704	0.275465	-0.056893	0.144456	0.150329	-0.031048
Sample 459	0.186420	0.180102	-0.043119	0.149260	0.144201	-0.034524
Sample 460	0.148564	0.157925	-0.021957	0.214802	0.228336	-0.031747
Sample 461	0.096765	0.091161	-0.009172	0.188259	0.177356	-0.017844
Sample 462	0.105591	0.112032	-0.011536	0.231347	0.245459	-0.025276
Sample 463	0.172557	0.177054	-0.037183	0.206198	0.211572	-0.044432
Sample 464	0.169326	0.182585	-0.028314	0.193059	0.208177	-0.032283
Sample 465	0.181973	0.178535	-0.029572	0.203384	0.199541	-0.033051
Sample 466	0.212181	0.214924	-0.041131	0.180472	0.182805	-0.034985
Sample 467	0.163862	0.162642	-0.014045	0.120764	0.119865	-0.010351
Sample 468	0.069865	0.069178	-0.020600	0.291945	0.289073	-0.086080
Sample 469	0.205920	0.212264	-0.029759	0.147905	0.152461	-0.021375
Sample 470	0.164086	0.168721	0.016718	0.144085	0.148155	0.014680
Sample 471	0.166372	0.173059	-0.026090	0.217458	0.226197	-0.034102
Sample 472	0.179469	0.182978	-0.017757	0.193305	0.197084	-0.019126
Sample 473	0.158407	0.165499	-0.021740	0.232951	0.243381	-0.031971
Sample 474	0.121719	0.128042	0.014343	0.193606	0.203664	0.022815
Sample 475	0.169809	0.186316	-0.035777	0.137827	0.151225	-0.029039
Sample 476	0.219212	0.212555	-0.057319	0.185225	0.179600	-0.048432
Sample 477	0.227881	0.237056	-0.027387	0.122060	0.126974	-0.014669
Sample 478	0.088200	0.084512	-0.009976	0.201058	0.192651	-0.022741
Sample 479	0.185228	0.192686	-0.052016	0.183049	0.190419	-0.051404

Sample 480	0.094631	0.091545	0.015316	0.187123	0.181021	0.030285
Sample 481	0.240169	0.254106	-0.037610	0.167020	0.176712	-0.026155
Sample 482	0.194662	0.201102	-0.026748	0.209107	0.216024	-0.028733
Sample 483	0.148258	0.150313	0.015774	0.210918	0.213843	0.022440
Sample 484	0.094363	0.090776	0.005993	0.205770	0.197948	0.013069
Sample 485	0.130132	0.130834	0.006818	0.239203	0.240493	0.012533
Sample 486	0.108879	0.115253	-0.012261	0.175447	0.185717	-0.019757
Sample 487	0.108808	0.110884	-0.023193	0.205697	0.209621	-0.043845
Sample 488	0.050538	0.047687	-0.011410	0.225988	0.213241	-0.051023
Sample 489	0.147234	0.134864	0.014187	0.152339	0.139541	0.014679
Sample 490	0.172414	0.172294	-0.033213	0.227818	0.227659	-0.043886
Sample 491	0.118081	0.119212	-0.016224	0.208073	0.210065	-0.028588
Sample 492	0.178876	0.173759	-0.029185	0.208950	0.202972	-0.034092
Sample 493	0.126811	0.127875	-0.014198	0.171952	0.173395	-0.019253
Sample 494	0.192866	0.196071	-0.026193	0.188715	0.191851	-0.025629
Sample 495	0.216783	0.215393	-0.031712	0.184052	0.182873	-0.026924
Sample 496	0.196753	0.197601	-0.036899	0.173106	0.173852	-0.032464
Sample 497	0.225125	0.229102	-0.042693	0.131849	0.134179	-0.025004
Sample 498	0.188916	0.204916	-0.035168	0.255643	0.277294	-0.047590
Sample 499	0.211196	0.219816	-0.033248	0.185797	0.193381	-0.029249
Sample 500	0.071531	0.067295	-0.007115	0.228457	0.214930	-0.022724

	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Authentic Leadership ->Safety Climate-> Safety Compliance	0.154913	0.044552	3.477142	0.000551
Authentic Leadership ->Safety Climate-> Safety Participation	0.155990	0.045702	3.413184	0.000694
Authentic Leadership -> Safety Climate -> Risky Behaviour	-0.016295	0.020387	0.799266	0.424516
Inclusive Leadership ->Safety Climate-> Safety Compliance	0.191416	0.041266	4.638648	0.000004
Inclusive Leadership -> Safety Climate->Safety Participation	0.192747	0.043485	4.432523	0.000011
Inclusive Leadership -> Safety Climate ->Risky Behaviour	-0.020135	0.023980	0.839661	0.401500

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Authentic Leadership -> Safety Climate	0.222192	0.226266	0.063687	3.488796	0.000528
Inclusive Leadership -> Safety Climate	0.274548	0.275014	0.059926	4.581467	0.000006
Safety Climate -> Risky Behaviour	-0.073337	-0.074684	0.083624	0.876990	0.380913
Safety Climate -> Safety Compliance	0.697205	0.697792	0.030743	22.678128	0.000000
Safety Climate -> Safety Participation	0.702050	0.704424	0.024179	29.035602	0.000000