
An alternative to methodological individualism: A non-reductionist approach to studying technology adoption by groups
(Saonee Sarker, Joseph S. Valacich- 2010)

Presented By Halil CİCİBAŞ

Outline

- The Concept of Methodological Individualism and Non-Reduction Approach
- Contributions Of the Study
- Theoretical Foundations of the study
- Hypotheses of the study
- Research Methodology of the study
- Analysis
- Results

Definitions

- Methodological Individualism
 - Any higher level social phenomena (i.e., organizational or group-related) “must be explained by the result of individual actions”
- Non-Reduction Approach
 - Higher level phenomenon can be explained by the patterned relationships among the individuals, and the circumstances that individuals in.

Aim of the study

- To illustrate the appropriateness of the alternate non-reductionist approach to investigating group-related phenomenon,
- To propose a new non-reductionist model for technology adoption by groups,
- To compare this non-reductionist model with a methodological individualist model

Results of the study

- The presented model provides a more robust explanation of technology adoption by groups than a methodological individualist view,
- Highlight some conditions wherein the methodological individualist view fails to provide correct explanations.

Problems with Methodological Individualism

- Most of the MIS researcher overlooked the following problems of the doctrine
 - a possible lack of **uniformity** in individual members' (initial) preferences/attitudes,
 - the importance of the “**we-ness**” in a group.

Lack of uniformity

- Variabilities often exists among group members,
- Such variabilities often causes conflict within a group
- Therefore, it is important to treat group phenomena as distinct from individual-level phenomena

We-ness problem

- Any group-related phenomenon, focus only on the individual members fails
 - To recognize the group as a distinct and unique entity
 - To inform what happens at the group level.
- The relational and interactional patterns among the members play a key role in groups

Doctrine of Non-Reductionism

- Higher level phenomenon can be explained by the patterned relationships among the individuals, and the circumstances that individuals in.
 - Any group activity is influenced by
 - The a priori preferences/attitudes of the individual members
 - The interactions and dynamics within a group (conflict, coalition formation, and various other types of social influence)
-

Lack of the previous studies

- Using methodological individualism to view the technology adoption by groups may lead to
 - Incorrectly assume that there is complete uniformity in the a priori attitudes of the individual members,
 - Ignore the “we-ness related” issues,

Contribution of this study

- Seek to address this important void by adopting a non-reductionist, multilevel lens
- Provide an assessment of whether this view is superior to a methodological individualist view
- Develop a model of Technology Acceptance by Groups (TAG)

Assumptions of this study

- Group members are expected to have a reasonable amount of influence on each other
- The group's task requires members to cooperate/collaborate for successful task completion
- Group members to come to an agreement or consensus on a suitable technology,
- The outcome of the decision has significant impact on the group

Theoretical Foundations of the study

- The developed model is based on Sarker's study (2005), it is
 - Multilevel
 - Non-reductionist
 - Distinct from methodological individualism
- Examine the role of the group's communication media on technology adoption,
- Examine the effect of the adoption on group outcomes

Theoretical Foundations of the study

- The study considers three levels of valence theories,
 - Social comparison theory (SCT)
 - Distributive valence model (DVM)
 - Group valence model (GVM)

Theoretical Foundations of the study

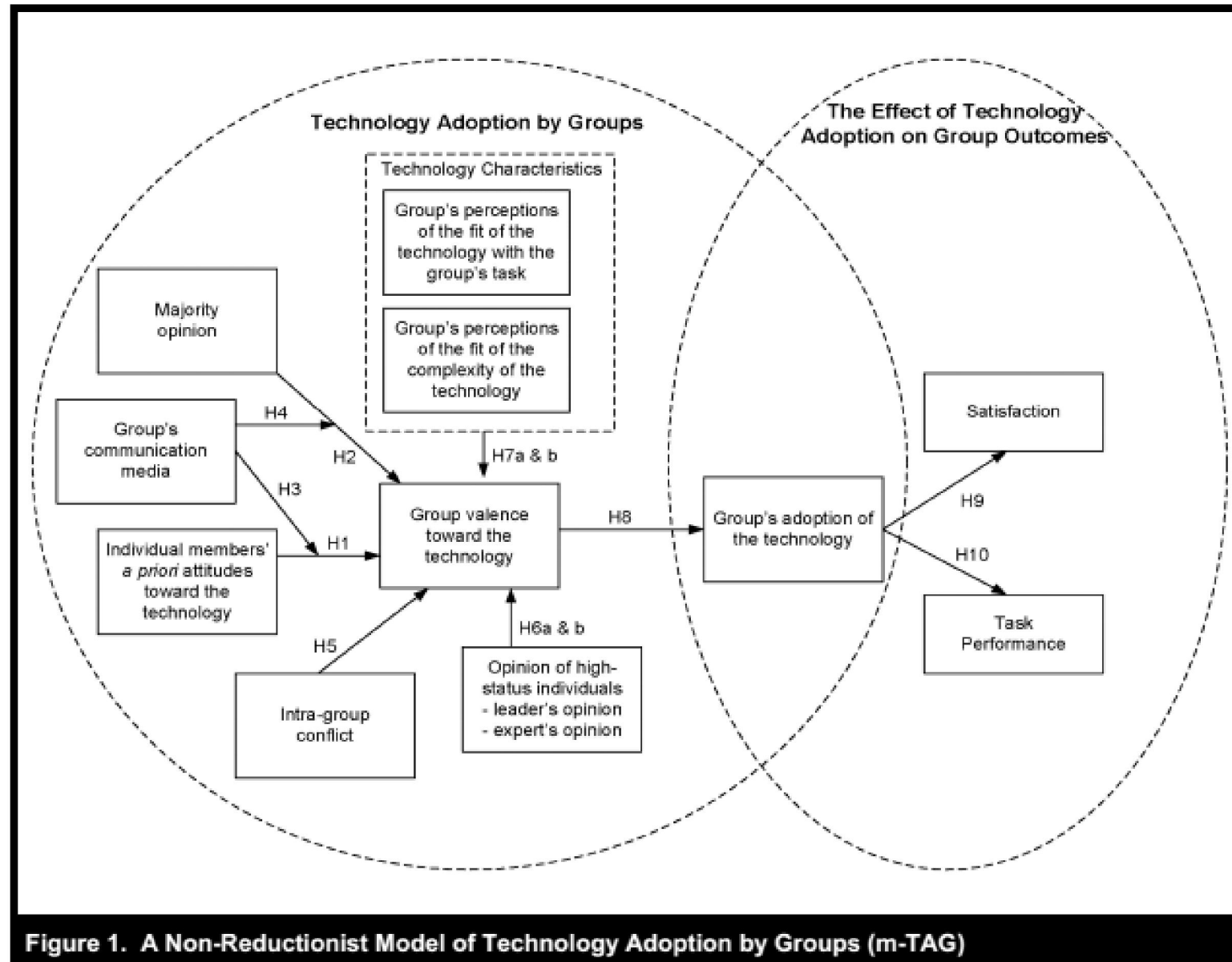






















Figure 1. A Non-Reductionist Model of Technology Adoption by Groups (m-TAG)

Hypotheses of the study

Case	Effect	Case	Effect
<i>Individual group members' a priori attitudes</i>		<i>the group's valence</i>	
<i>The majority's opinion</i>		<i>the group's valence</i>	
<i>group members' a priori attitudes</i>	<i>will be higher in CM groups than in face-to-face groups.</i>		
<i>majority's opinion</i>	<i>will be higher in face-to-face groups than CM groups.</i>		
<i>substantive conflict</i>		<i>the group's valence</i>	
<i>opinion of the individual possessing structural power within a group</i>		<i>the group's valence</i>	
<i>The opinion of the individual possessing personal power</i>		<i>the group's valence</i>	
<i>The group's perception regarding the fit of a technology for its task</i>		<i>the group's valence</i>	

Hypotheses of the study

Case	Effect	Case	Effect
<i>The group's perception regarding the complexity of the technology</i>		<i>the group's valence</i>	
<i>The group's valence</i>		<i>the group's adoption of that technology</i>	
<i>A group's strength of adoption of a technology</i>		<i>the group's satisfaction</i>	
<i>A group's strength of adoption of a technology</i>		<i>group's task performance</i>	

Hypotheses of the study

- The study propose 12 hypotheses;
 - *H1: Individual group members' a priori attitudes toward a technology will positively affect the group's valence toward that technology*
 - *H2: The majority's opinion regarding a technology will positively affect the group's valence toward that technology*
 - *H3: The effect of the group members' a priori attitudes on the group's valence toward a technology will be higher in CM groups than in face-to-face groups.*
 - *H4: The effect of the majority's opinion on the group's valence toward a technology will be higher in face-to-face groups than CM groups.*
-

Hypotheses of the study

- The study propose 12 hypotheses;
 - *H5: The extent of substantive conflict within the group will have a negative effect on the group's valence toward a technology*
 - *H6a: The opinion of the individual possessing structural power within a group in favor of a particular technology will positively affect the group's valence toward that technology.*
 - *H6b: The opinion of the individual possessing personal power in favor of a particular technology will positively affect the group's valence toward that technology*
 - *H7a: The group's perception regarding the fit of a technology for its task will positively affect the group's valence toward the technology*

Hypotheses of the study

- The study propose 12 hypotheses;
 - *H7b: The group's perception regarding the complexity of the technology will negatively affect the group's valence toward that technology.*
 - *H8: The group's valence toward a technology will positively affect the group's adoption of that technology*
 - *H9: A group's strength of adoption of a technology will positively affect the group's satisfaction*
 - *H10: A group's strength of adoption of a technology will positively affect the group's task performance.*

Hypotheses of the study

- Hypothetical methodological individualist group version of TAM (or G-TAM), the average perceived ease of use and perceived usefulness of the members within a group would affect the average intention to adopt a technology within a group.;
- But the study argues that such a perspective would not see the social influence-related variables or the role of higher-level group variables as being relevant to the adoption decision.
 - *H11: m-TAG will be a better predictor of a group's technology adoption than G-TAM*
 - *H12: In the absence of homogeneity among the group members' a priori choice of a technology, mTAG will predict a group's technology adoption better than G-TAM.*

Research Methodology of the study

- Sampling
 - 107 groups with 321 students
 - 99 useable groups, (49 face-to-face, 50 CMC)
 - Task
 - To generate a flowchart of an application
 - Why Flowchart? since it is an intellectual task to assess the quality of groups.
 - Technology
 - MS Word or MS Visio to draw the flowchart
 - MS Netmeeting to communicate
-

Research Methodology of the study

- The study use both individual and group-level measures, depending on the context.
- Measure the scales using discussion method
 - Group valence,
 - Complexity of the technology,
 - Task–technology fit,
 - Groups' adoption of the technology
 - Priori attitude of the individuals
 - Satisfaction
 - Conflicts
 - Majority decisions
 - Opinions of high-status individuals

Research Methodology of the study

- Conduct a pilot study to validate the instruments.
- Participants attend a training course and experience in the tools and take a short quiz.
- Participants were asked to complete a short questionnaire that to specify the tool to perform flowcharting task and their attitudes toward the tool (Word or Visio).

Research Methodology of the study

- Then, Each group was given 25 minutes to work on the task.
- Instruction to the participants: Decide with your other group members as to which tool your group would like to use for creating the diagram.
- How they select the drawing tool?
 - Face-to-face groups: negotiate and communicate
 - CM groups: upon which the entire group agreed, methodological individualist view would not have reflected the group's final choice.

Research Methodology of the study

- Participants complete the flowcharting task with tool they have chosen
 - Then, they complete a questionnaire measuring their satisfaction and intra-group conflict.
 - Then, groups were asked to **jointly** complete a questionnaire measuring the
 - group's valence,
 - strength of adoption of the technology,
 - perceptions about the task–technology fit,
 - voluntariness in using the technology chosen.
-

Table 2. Summary of Measures Used in the m-TAG Model

Specific Variable in m-TAG	Measure Used
Members' <i>a priori</i> attitudes toward the technology	Four item scale of individual attitudes from Davis et al. (1989), administered to individual group members, and average of scores taken as the input
Medium of communication used by members	Binary measure that captured whether communication media was computer-mediated or face-to-face
Group valence	Four new items measuring the group's positive orientation and feeling toward the technology
Group's strength of adoption of the technology	Three newly developed items measuring <i>group's</i> strength of adoption of the technology
Task–technology fit	Four items modified from the task–technology fit scale (Goodhue 1997)
Complexity of the technology	Two items drawing on prior research (e.g., Karahanna and Straub 1999; Rogers 1995)
Majority opinion	Binary measure that captured whether or not the majority's choice of tool was same as that of the group
Intra-group conflict	Issue-based conflict scale from Miranda and Bostrom (1993-94)
Opinion of the leader	Binary measure that captured whether or not the leader had chosen the same tool for the individual part of the exercise as the one chosen by the group after the group interaction (in other words, it assessed the influence of the leader's opinion)
Opinion of the expert	Binary measure that captured whether or not the expert had chosen the same tool for the individual part of the exercise as the one chosen by the group after the group interaction (in other words, it assessed the influence of the expert's opinion)
Task performance	Rating of the solution (on its correctness, completeness, and overall quality) by independent raters
Satisfaction	Modified version of Green and Taber's (1980) scale measuring process and solution satisfaction

Table 3. Descriptive Statistics and Item Loadings

Scale Item	Construct	Item Mean	Item S.D.	Item Loading [†]
Att1	<i>A priori Attitudes</i>	5.98	0.591	.91
Att2		5.67	0.77	.76
Att3		4.91	1.14	.68
Att4		5.56	0.70	.86
GV1	Group Valence	5.86	1.16	.90
GV2		5.88	1.27	.90
GV3		6.13	1.07	.90
GV4		5.89	1.27	.74
Conf1	Conflict	2.13	0.88	.93
Conf2		2.63	1.33	.78
Conf3		2.31	0.87	.83
Conf4		2.75	0.89	.71
Conf5		3.05	1.33	.76
Conf6		1.99	0.82	.91
TTF1	Task–Technology Fit	5.96	1.29	.75
TTF2		6.12	1.11	.92
TTF3		6.23	0.99	.91
TTF4		6.11	1.15	.63
COMPL1	Complexity of the Technology	2.55	1.66	.93
COMPL2		2.55	1.54	.89
GSA1	Group's Strength of Adoption of Technology	6.31	0.97	.85
GSA2		6.28	0.95	.79
GSA3		4.59	2.04	.58
SAT1	Satisfaction	4.93	0.72	.52
SAT2		5.19	0.83	.68
SAT3		5.54	1.08	.88
SAT4		5.57	0.91	.83
SAT5		5.66	0.99	.89
SAT6		5.14	1.11	.77
SAT7		5.46	0.98	.83
SAT8		5.34	1.04	.82
SAT9		5.55	1.03	.88
SAT10		5.42	1.03	.89
Task_Perf1	Solution Quality	5.17	1.41	.97
Task_Perf2		5.48	0.98	.73
Task_Perf3		5.32	1.23	.99









Table 6. Correlations between the Items and the Constructs

	<i>A priori Attitudes</i>	<i>Group Valence</i>	<i>Group's Strength of Adoption of Technology</i>	<i>Conflict</i>	<i>Task- Technology Fit</i>	<i>Complexity of the Technology</i>	<i>Solution Quality</i>	<i>Satisfaction</i>
Att1	0.91	0.41	0.28	-0.06	0.27	-0.24	0.12	0.21
Att2	0.76	0.23	0.21	-0.18	0.27	-0.10	0.03	0.11
Att3	0.68	0.24	0.15	-0.14	0.10	-0.22	0.02	0.07
Att4	0.86	0.42	0.30	0.00	0.30	-0.24	0.05	0.14
GV1	0.46	0.90	0.56	-0.20	0.50	-0.44	0.35	0.57
GV2	0.36	0.90	0.62	-0.16	0.55	-0.39	0.39	0.59
GV3	0.23	0.75	0.45	-0.03	0.49	-0.44	0.10	0.26
GV4	0.41	0.90	0.54	-0.19	0.59	-0.50	0.24	0.48
GSA1	0.26	0.53	0.85	-0.22	0.48	-0.33	0.11	0.29
GSA2	0.25	0.44	0.80	-0.10	0.33	-0.23	0.07	0.13
GSA3	0.17	0.43	0.58	-0.17	0.20	-0.19	0.23	0.29
Conf1	-0.15	-0.19	-0.24	0.94	-0.22	0.29	-0.10	-0.46
Conf2	-0.03	-0.11	-0.12	0.78	-0.04	0.13	-0.11	-0.34
Conf3	0.01	-0.01	-0.09	0.83	-0.10	0.13	-0.17	-0.38
Conf4	0.13	-0.02	-0.10	0.71	-0.08	0.14	-0.09	-0.26
Conf5	0.00	-0.02	-0.05	0.76	-0.06	0.09	-0.06	-0.25
Conf6	-0.09	-0.17	-0.25	0.91	-0.24	0.17	-0.12	-0.45
TTF1	0.32	0.52	0.25	-0.08	0.75	-0.22	0.32	0.37
TTF2	0.20	0.57	0.42	-0.29	0.92	-0.40	0.25	0.45
TTF3	0.25	0.55	0.50	-0.15	0.91	-0.39	0.26	0.47
TTF4	0.19	0.31	0.30	-0.10	0.63	-0.30	0.12	0.25
COMPL1	-0.24	-0.51	-0.36	0.17	-0.35	0.93	-0.23	-0.28
COMPL2	-0.23	-0.42	-0.26	0.25	-0.40	0.90	-0.37	-0.40
Task_Perf1	0.06	0.29	0.22	-0.11	0.28	-0.33	0.97	0.41
Task_Perf2	0.12	0.30	0.05	-0.03	0.26	-0.17	0.73	0.42
Task_Perf3	0.06	0.32	0.17	-0.15	0.30	-0.31	0.99	0.48
SAT1	0.09	0.21	0.09	-0.09	0.18	-0.03	0.19	0.52
SAT2	0.01	0.37	0.20	-0.28	0.31	-0.18	0.20	0.68
SAT3	0.16	0.51	0.36	-0.43	0.38	-0.38	0.49	0.88
SAT4	0.20	0.54	0.30	-0.37	0.44	-0.34	0.38	0.83
SAT5	0.17	0.56	0.33	-0.43	0.38	-0.36	0.51	0.89
SAT6	0.16	0.49	0.32	-0.44	0.48	-0.37	0.44	0.77
SAT7	0.14	0.36	0.21	-0.39	0.37	-0.23	0.32	0.83
SAT8	0.04	0.37	0.21	-0.41	0.36	-0.20	0.30	0.82
SAT9	0.21	0.47	0.27	-0.44	0.52	-0.37	0.36	0.88
SAT10	0.19	0.52	0.29	-0.42	0.46	-0.327	0.43	0.89

Hypotheses of the study

Case	Effect	Case	Effect
<i>Individual group members' a priori attitudes</i>	↑	<i>the group's valence</i>	↑
<i>The majority's opinion</i>	↑	<i>the group's valence</i>	↑
<i>group members' a priori attitudes</i>	<i>will be higher in CM groups than in face-to-face groups.</i>		
<i>majority's opinion</i>	<i>will be higher in face-to-face groups than CM groups.</i>		
<i>substantive conflict</i>	↑	<i>the group's valence</i>	↓
<i>opinion of the individual possessing structural power within a group</i>	↑	<i>the group's valence</i>	↑
<i>The opinion of the individual possessing personal power</i>	↑	<i>the group's valence</i>	↑
<i>The group's perception regarding the fit of a technology for its task</i>	↑	<i>the group's valence</i>	↑

Hypotheses of the study

Case	Effect	Case	Effect
<i>The group's perception regarding the complexity of the technology</i>		<i>the group's valence</i>	
<i>The group's valence</i>		<i>the group's adoption of that technology</i>	
<i>A group's strength of adoption of a technology</i>		<i>the group's satisfaction</i>	
<i>A group's strength of adoption of a technology</i>		<i>group's task performance</i>	

Analysis

Hypothesis	True	False
<i>Individual group members' a priori attitudes toward a technology will positively affect the group's valence toward that technology</i>		√
<i>The majority's opinion regarding a technology will positively affect the group's valence toward that technology</i>	√	
<i>The effect of the group members' a priori attitudes on the group's valence toward a technology will be higher in CM groups than in face-to-face groups.</i>	√	
<i>The effect of the majority's opinion on the group's valence toward a technology will be higher in face-to-face groups than CM groups.</i>	√	
<i>The extent of substantive conflict within the group will have a negative effect on the group's valence toward a technology</i>		√
<i>The opinion of the individual possessing structural power within a group in favor of a particular technology will positively affect the group's valence toward that technology.</i>		√

Analysis

Hypothesis	True	False
<i>The opinion of the individual possessing personal power in favor of a particular technology will positively affect the group's valence toward that technology</i>	√	
<i>The group's perception regarding the fit of a technology for its task will positively affect the group's valence toward the technology</i>	√	
<i>The group's perception regarding the complexity of the technology will negatively affect the group's valence toward that technology.</i>	√	
<i>The group's valence toward a technology will positively affect the group's adoption of that technology</i>	√	
<i>A group's strength of adoption of a technology will positively affect the group's satisfaction</i>	√	
<i>A group's strength of adoption of a technology will positively affect the group's task performance.</i>	√	

Compare m-TAG with G-TAM

Hypothesis	True	False
<i>m-TAG will be a better predictor of a group's technology adoption than G-TAM</i>	√	
<i>In the absence of homogeneity among the group members' a priori choice of a technology, mTAG will predict a group's technology adoption better than G-TAM.</i>	√	

Results

- Non-reductionist m-TAG provides a more robust explanation of technology adoption by groups than the methodological individualist G-TAM.
- The results indicated that in the absence of complete within-group agreement, G-TAM fails to predict a group's technology adoption phenomenon.

Contributions

- The results of the study;
 - ❑ The study's primary finding that groups should be treated as a separate entity and not only as an aggregation of individual members points to an important practical implication.
 - ❑ The expert's opinion plays a key role in shaping the valence of the group toward a particular technology.
 - ❑ The perceived complexity of the technology has a negative effect on a group's valence.
 - ❑ A strong effect of the groups' perceptions of the fit between a technology and its task.

There is no silver bullet!!

- Since the following issues must be considered in further studies;
 - ❑ The study should be utilized on organizational groups rather than students
 - ❑ It should be used advanced communication medium or electronic media (such as VTC)
 - ❑ Other types of technologies such as a group support system (GSS) or a group communication system should be used rather than a flowcharting tool to assess the IT adoption
 - ❑ Need to inform researchers about what happens when the majority's view conflicts with the high-status individuals, and how such conflicts may get resolved
-