

The Antecedents of Commitment towards Collaborative Work Practice Outcomes

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Abstract

Collaboration technologies offer benefits for organizations to make teamwork more productive and creative. Yet the organizational transition towards using particular types of collaboration technologies is often fraught with challenges. A key condition for successfully transitioning towards a new way of working is that the stakeholders are committed to the outcomes of the new collaboration process. Little is known about the antecedents of this commitment. This study investigates the antecedents of user commitment using the Technology Transition Model (TTM) and Yield Shift Theory (YST). Specifically, this study examines the effect of satisfaction with process (SP), satisfaction with outcomes (SO), and perceived magnitude of net value (MNV) on user commitment (C) to the results of collaborative work practices. Subjects from three international organizations participated in the study. Results show that MNV and SO predict commitment while SP partially predicted commitment, with MNV the strongest predictor.

1. Introduction

Collaboration technologies provide great benefits to teams and organizations. Such technologies may focus users working collaboratively on specific tasks towards a common goal, while reducing cognitive load [1, 2]. For example, a variety of field and lab studies document the potential benefits of collaborative work practices to team productivity (for examples, see [3-11]) [1].

While reported experiences with collaboration technologies may be successful, it is of particular importance to understand the level of commitment of stakeholders involved in the technology-supported collaborative work practice to the results of their collaborative effort. Without such commitment, future efforts using the same technology may be uncertain, while the implementation of the decisions and other outcomes of collaborative work will be

questionable. We study commitment to collaborative work practice outcomes through a dual theoretical lens: The Technology Transition Model (TTM) seeks to understand the sustained use of a new collaborative technology and what affects this sustained use [12]. Studies have used the TTM in various ways, for example at understanding the effect of the personality of users of social media technologies [13]. The Yield Shift Theory of Satisfaction (YST) is a causal theory that seeks to offer an explanation of the satisfaction response of individuals [14].

Our study uses TTM and YST to investigate the antecedents of commitment to the outcomes of a new collaborative work practice. The specific purpose of this study is to understand how three antecedents – satisfaction with process (SP), satisfaction with outcomes (SO), and perceived magnitude of net value (MNV) – affect the commitment to the outcome (C) of using a collaborative technology. During our study, we introduced a new technology-supported collaborative work practice in three different organizations. Although the groups focused on different tasks, purposes, and deliverables, each group was introduced for the first time to a collaborative work practice that was considered to become the new standard for performing a certain task. These tasks involved (1) innovation ideation of service products, (2) collaborative writing of standards and policies, and (3) negotiating information system requirements.

The remainder of the paper is organized as follows. The next section provides the background for the study, including the constructs of our model, TTM, YST, collaborative work practice, and the proposed research model. In the following section, we describe the method for our study. Next, we present the results of the study. In the final section, we discuss our findings, describe the study's limitations, and outline future research.

2. Background

2.1 Commitment

The main construct of interest in our study is commitment. Defining commitment, depends on the object of the commitment, such as commitment to an organization or commitment to a job [15]. We define commitment for the context of our study as the commitment to the outcome of a collaborative work practice.

Commitment is a broad construct that has been studied in many disciplines and for different purposes. Commitment has been one of the most popular research subjects in industrial/organizational psychology for decades [16, 17]. Studies focus on investigating phenomena such as organizational commitment [15, 17-19] and job commitment [15]. The literature shows that there is inconsistent evidence regarding the consequences and antecedents to organizational commitment [17].

Commitment plays a major role in determining the success of an outcome [16]. Commitment relates to goal congruence, which is the degree that individuals perceive that working towards group goals also attains individual private goals [20]. Commitment in a collaboration context can be defined as “a force that binds an individual to spend resources (time, effort, knowledge, and physical resources) to achieve the group goal” [21, p. 4]. When we have commitment among the individuals in a group, this means participants are committed to the goal, willing to contribute, willing to compromise, listen to each other, and feel their contribution was useful [21].

Most research on collaborative work practices and IS success study user involvement, user attitudes, and commitment to using a system [22]. Specific examples of these include the effects of work exhaustion and job satisfaction on organizational commitment [23], employee commitment to an organizational change [24], commitment of knowledge workers in the context of knowledge management systems implementation [25], commitment to IT projects [26, 27], job commitment to the organization [28], and commitment to team goals in virtual projects [27, 29].

The focus of most prior research is on commitment to a process or system use. For our study, however, we focus on commitment to outcomes. To the best of our knowledge, no studies reflect the attitude of individuals on commitment to the outcome of a collaborative work practice. A deeper understanding of commitment to collaborative work practice outcomes may inform strategies to

facilitate the implementation of outcomes and foster future commitment towards the work practice and its related technology support.

2.2 Satisfaction

Satisfaction is a broad concept covering many applications and domains, such as consumer behavior (marketing) [30], job satisfaction (industrial-organizational psychology) [31], and information systems (IS) use [32]. Locke originally defined satisfaction in the context of job performance as “a pleasurable or positive emotional state resulting from the appraisal of one’s job” [31, p. 1300, 32]. Oliver extended satisfaction to the context of individual consumption, defining it as “the summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer’s prior feelings about the consumption experience” [32]. Bhattacharjee identified the similarities in these definitions, that both underscore the psychological or affective state of a cognitive appraisal on a performance expectation [32, 33, p. 29].

Understanding satisfaction is useful for incorporating IT into an organization’s collaborative work practices [34], and is motivated by management’s desire to improve the productivity of IS [35]. Additionally, satisfaction is important in IS because the cost of failed systems can be high [14] and satisfaction is a key indicator of IS success [36]. Many definitions of satisfaction exist in IS literature. The Yield Shift Theory of Satisfaction explains the variations in these definitions, categorizing definitions of satisfaction as *judgment*, *affect*, and *mixed* [14]. Satisfaction as judgment deals with how well individuals’ information needs are being satisfied [14, 37], for example in terms of system output attributes such as information content, accuracy, ease of use, and timeliness [14, 38]. Examples of satisfaction as affect include enjoyment and satisfaction with an IS [14, 39], delight or disappointment with using a system [14, 40], and whether technology users felt good, happy, or satisfied with the technology [14, 41]. Examples of mixed definitions include the judgment of how pleasurable a service is [14, 42] and the affective state from a working relationship with another firm [14, 43].

YST aims to explain and predict the satisfaction response. In other words, it represents a causal theory of the satisfaction response. This theory contains six key constructs – goal, satisfaction response, utility, likelihood, yield, active goal set, and perceived shift in yield. These constructs are defined in table 1.

Table 1. Constructs and definitions of YST [14]

Construct	Definition
Goal	A desired state or outcome.
Satisfaction response	A valenced affective arousal with respect to some object that has reference to an individual's goal.
Utility	The benefit or value an individual subconsciously ascribes to attaining a goal.
Likelihood	The degree to which an individual subconsciously believes a goal to be attainable.
Yield	A multiplicative function of the utility and likelihood an individual ascribes to attaining a goal or a set of goals.
Active Goal Set	The subset of goals currently being assessed by the subconscious mind for changes in yield.
Perceived Shift in Yield	A subconscious perception that the overall yield for the active goal set has changed.

In YST, the phenomenon of interest is the satisfaction response, defined as “a valenced affective arousal with respect to some object that has reference to an individual's goal” [14, p. 275]. Furthermore, in our study, this satisfaction response is a construct used as an independent variable. Each of the YST constructs is important for our study because YST posits that perceptions of utility, likelihood, and yield shifts are antecedents to satisfaction responses [14].

2.3 Technology Transition Model – Perceived Magnitude of Net Value

The Technology Transition Model (and its later incarnation, the Value Frequency Model) was developed to explain self-sustaining behaviors of collaboration technology users [12, 13, 54]. TTM posits that intention to use a system is dependent on the magnitude of net value that people perceive they will obtain after they switch to the new technology and the frequency they perceive this benefit will be obtained [13]. Many theories and models have been created to predict technology adoption, such as the Technology Acceptance Model (TAM) [44]. TTM advances these models by including a mechanism whether the use of a technology is continued or abandoned over time [12]. Where TAM predicts and

explains a state of mind after using a technology one time, TTM explains what causes a group of technology users to become self-sustaining [12]. TAM has two limitations that cannot explain acceptance in a collaborative work practice. First, TAM predicts the acceptance of a technology pertaining to a single task at a single point in time [45]. Second, TAM cannot predict technology acceptance of groups working together simultaneously [12]. TTM overcomes these limitations, because it focuses on the collaborative work practice, which involves multiple tasks, multiple technologies, and is used by people working together simultaneously [22, 46, 54].

TTM posits that actual system use is a function of behavioral intentions, and that behavioral intentions are a multiplicative function of perceived net value and perceived frequency of net value (figure 1) [12]. Net value varies along seven dimensions. When an individual perceives the magnitude of net value, this magnitude varies due to these dimensions. The importance of these dimensions is in how users perceive the positive and negative value of using a system. The first dimension, usefulness, is the most prominent dimension. Usefulness refers to the degree to which the technology will enhance job performance [12, 44]. The second dimension is affective value, which refers to the value an individual attaches to positive or negative emotional responses to using the technology [12]. Third, economic value weighs the change in economic status for the individual or organization [12]. Fourth, physical value is how the system might affect the health and well-being of the individual [12]. Fifth, political value is how the new system may shift power in the organization by changing how people work and interact with the system [12]. Sixth, social value is how much the system affects personal relationships among users [12]. Last, cognitive value is how the cognitive effort changes over time to accomplish tasks [12]. The cognitive value contains three dimensions. First, the technical value comes from the difficulty of using the technology [12]. Second, access value comes from changes in the cognitive load of getting access and permission to use a technology [12]. Third, conceptual value comes from understanding what the system will do for the user [12].

Perceived net value of transition acts as a moderator on perceived frequency of net value, perceived net value, and behavioral intention. Last, certainty acts as a multiplicative moderator on perceived net value with respect to behavioral intention.

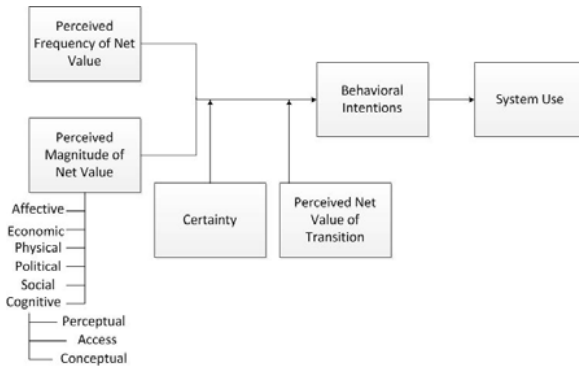


Figure 1. Technology Transition Model [12].

The significance of TTM in our study is on the attitudes of users of a new technology. TTM is a testable and extendable model. Briggs and colleagues recommend that the model be tested empirically with experiments to support the key relationships [12]. As testing all relationships in a single study is challenging, we chose to focus on the perceived magnitude of net value, similar to the study by [13], which explored the effects of personality on the model. Perceived net value is defined as “an attitude, a valenced subjective assessment in response to all the perceived likely consequences of changing from existing technology to the proposed technology” [12]. The magnitude of this value is a measure of how a user feels about the likely differences [12].

2.5 Research Model

Figure 2 displays our research model; satisfaction with process, satisfaction with outcomes, and perceived magnitude of net value are antecedents to commitment to the outcomes of a collaborative work practice.

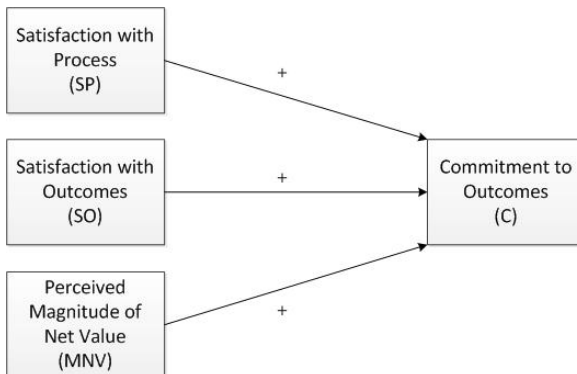


Figure 2. Antecedents of Commitment to Outcomes.

Research on satisfaction in collaborative work practices has been equivocal, meaning research is needed to advance the constructs of satisfaction [47]. While all constructs of the satisfaction response are important, the focus of our study is on satisfaction with the collaborative process and satisfaction with its outcomes. We focus on these constructs for two reasons. First, meetings contain at least two aspects for which a person could feel satisfaction: (1) the meeting outcomes and (2) the meeting process [41]. Second, satisfaction with process and satisfaction with outcomes are a function of goal attainment in technology-supported groups [48]. When people participate in the decision-making process, they develop an understanding of the outcome and are more likely to be satisfied with the process [49, 50]. Thus, individuals who have a positive view on the satisfaction response should also be committed to the outcome of the collaborative work practice. We hypothesize:

H1: *Individuals that score high on satisfaction with process will also score high on commitment to the outcomes of the collaborative work practice.*

H2: *Individuals that score high on satisfaction with outcomes will also score high on commitment to the outcomes of the collaborative work practice.*

The TTM constructs, and specifically the perceived magnitude of net value, leave an important question. Do an individual's perceptions of the magnitude of net value refer to the outcome of using a technology, in addition to the technology itself? We extend the TTM view of perceived magnitude of net value to understand commitment to the outcome of the technology use. We further extend the TTM model to address technology use by asking questions about the collaborative work practice. For example, the questionnaire asked about the degree that users felt about the process in regards to how much better off they are, how valuable the process was, how much they gain by using the process, and how much they benefit from the process. In this study, we do address the perceived frequency of net value because our field data concerns the outcome of a single collaborative work practice, which frequency will not help explain.

When perceived magnitude of net value is higher, we expect that the prospective user's commitment towards the technology-supported collaborative work practice will be higher; when the magnitude is lower, the level of commitment will be lower. Thus, we hypothesize:

H3: Individuals with higher perceived magnitude of net value scores will have a higher level of commitment to the outcomes of the collaborative work practice.

3. Method

For this study, we designed and facilitated a new collaborative work practice with three US companies to explore the constructs. The first company is a firm that offers risk assessment services and decision analytics. The focus of the project with this company was on product innovation within their IT organization. The second company is a medical services research organization, which conducts biomedical research and provides science education. The focus of this project was on gathering requirements in Agile software development projects in the IT organization. The third company is a non-profit organization that promotes the advanced use of remote medical technologies. The focus of this project was on a collaborative writing process, creating a standards document for telemedicine standards and guidelines.

Field data were collected from 143 participants from the three organizations (56, 39, and 48 from each organization respectively), where groups were engaged in a real collaborative task to apply the designed collaborative work practice. The collaborative work practice for each organization was executed 3 times for a total of 9 sessions. The length of the sessions ranged from half a day to two days. Group size ranged from six to 27 participants.

Immediately following the sessions, participants completed a paper-based questionnaire to collect their experience of using the technology and processes. The survey consisted of 18 questions that aimed to measure satisfaction with process, satisfaction with outcomes, magnitude of net value, and commitment to outcomes, in addition to 4 questions about demographics. Every person in the group filled out a questionnaire at the end of the collaborative session. All questions used a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7). The next subsections describe the parts of the questionnaire.

3.1 Commitment

Commitment to outcome was measured using an adaptation of the short form of the Organizational Commitment Questionnaire developed by [51]. The original questionnaire measured organizational commitment. Cronbach's alpha for the original

questionnaire was .88. These psychometric properties have been supported by other researchers [52].

For the purpose of this study, the wording of the items was changed to reflect the team members' attitudes towards the outcomes of the collaborative work practice. Consequently, the adapted questionnaire measures the extent to which the team members are willing to stand by the results of the new technology-supported process and make active effort towards the implementation of the results. A sample item in the instrument is "I am willing to put in a great deal of effort to see the successful implementation of our ideas."

3.2 Satisfaction

The satisfaction questionnaire was adapted from [48]. It consists of ten questions – five measuring satisfaction with process and five measuring satisfaction with outcomes. Examples of questions include "I feel satisfied with the way in which today's workshop was conducted", and "I feel satisfied with the things we achieved in today's workshop". Cronbach's alpha for the items of the constructs range from 0.925 to 0.972 [34].

3.3 Perceived Magnitude of Net Value

The MNV questionnaire was adapted from [49], consisting of four questions. Questions measured perceived benefits that the respective collaborative technology tool would bring the participant when (s)he used it. Examples of questions include "Overall, I will be better off using today's process.", and "I will gain by starting to use the process".

3.4 Demographics

Table 2 contains information of several demographic variables that were collected, including gender, age, years of full time work experience, and number of workshops that used similar techniques attended.

4. Results

Table 3 contains descriptive statistics for the variables used in our model. A hierarchical multiple regression, per the recommendations of [53], was performed in three steps and the results are shown in Table 4 and Table 5. This analysis was used to examine the amount of variability in commitment that satisfaction with outcomes accounts for after controlling for satisfaction with process, and the

Table 2. Demographics of Participants.

Variable	Category	Frequency	Percent	Missing responses
Gender	Male	81	61.4	11
	Female	51	38.6	
Age	20-25	0	0	8
	26-30	2	1.5	
	31-40	27	20	
	41-50	52	38.5	
	> 50	54	40	
Years of full time experience	1-10	6	4.6	11
	11-20	44	33.3	
	21-30	56	42.4	
	31-40	24	18.2	
	41-50	2	1.5	
Similar techniques	0	42	30.9	7
	1-2	64	47	
	3-5	22	16.2	
	6-10	6	4.4	
	>10	2	1.5	

amount of variability in commitment that magnitude of net value accounts for after controlling for satisfaction with process and satisfaction with outcomes. The commitment factor was the dependent variable, while satisfaction with process, satisfaction with outcomes, and magnitude of net value were treated as independent variables.

Satisfaction with process was entered at step one, explaining 22.7% of the variance in commitment. The model was significant, with $p < .001$. The regression weight for satisfaction with process was significant ($p < .001$, $\beta = .379$). After entry of satisfaction with outcomes at step two, the regression model as a whole accounted for 30.5% of the variance in commitment, with the R squared increment (7.8%) due to the effect of adding satisfaction with outcomes to the model. The model was significant, with $p < .001$. The regression weight for satisfaction with process was not significant ($p = .155$, $\beta = .122$), and the regression weight for satisfaction with outcomes was significant ($p < .001$, $\beta = .296$). The results suggest that satisfaction with outcomes is a stronger predictor of commitment than satisfaction with process. After entry of magnitude of net value at step three, the regression model as a whole accounted for 41% of the variance in commitment, with the R squared increment (10.5%) due to the effect of adding magnitude of net value to the model. The model was significant, with $p < .001$. The regression weight for satisfaction with process was not significant ($p = .723$, $\beta = .029$). The regression weight for satisfaction with outcomes was significant ($p = .028$, $\beta = .164$). The regression weight for magnitude of net value was significant ($p < .001$, $\beta = .351$). The results suggest that the

magnitude of net value is the strongest predictor of commitment, followed by satisfaction with outcomes.

Hypothesis 1, which suggested that individuals with higher satisfaction with process also would score higher on commitment, was partially supported. The hypothesis was only supported in the first model, when considering satisfaction with process as the only predictor of commitment. This suggests that satisfaction with process is a weak predictor of commitment.

Hypothesis 2, which suggested that individuals with higher satisfaction with outcomes would have a score higher on commitment, was supported.

Hypothesis 3, which suggested that individuals with higher perceived magnitude of net value scores would score higher on commitment, was supported. Moreover, we found that magnitude of net value ($p < .001$, $\beta = .287$) has a higher effect on commitment than satisfaction with outcomes ($p = .028$, $\beta = .164$). This suggests that magnitude of net value is the strongest predictor of commitment, followed by satisfaction with outcomes.

5. Discussion

The purpose of this study was to understand how three constructs, – satisfaction with process, satisfaction with outcomes, and perceived magnitude of net value – affect the commitment to the outcome of a collaborative work practice. The findings show that the perceived magnitude of net value was the strongest predictor of commitment, highlighting the importance of communicating the value of the collaborative work practice.

Table 3. Descriptive statistics for included variables (n = 143)

	Range	Minimum	Maximum	Mean	Std. Deviation
SatisfactionWithProcess	3.60	3.40	7.00	5.94	.94
SatisfactionWithOutcomes	5.60	1.40	7.00	5.68	1.08
MagnitudeOfNetValue	4.75	2.25	7.00	5.60	.92
Commitment	3.75	3.25	7.00	6.18	.75

Note: Min/Max values represent the minimum/maximum value of average scores

Table 4. Model regression summary.

Model	R	R Square	Adjusted R Square	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
1	.476 ^a	.227	.222	.227	41.411	1	141	.000
2	.552 ^b	.305	.295	.078	15.729	1	140	.000
3	.640 ^c	.410	.397	.105	24.633	1	139	.000

a. Predictors: (Constant), SatisfactionWithProcess

b. Predictors: (Constant), SatisfactionWithProcess, SatisfactionWithOutcomes

c. Predictors: (Constant), SatisfactionWithProcess, SatisfactionWithOutcomes, MagnitudeOfNetValue

Table 5. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.933	.354		11.117	.000
	SatisfactionWithProcess	.379	.059	.476	6.435	.000
2	(Constant)	3.775	.339		11.136	.000
	SatisfactionWithProcess	.122	.086	.154	1.429	.155
	SatisfactionWithOutcomes	.296	.075	.427	3.966	.000
3	(Constant)	3.112	.341		9.130	.000
	SatisfactionWithProcess	.029	.081	.036	.355	.723
	SatisfactionWithOutcomes	.164	.074	.237	2.224	.028
	MagnitudeOfNetValue	.351	.071	.434	4.963	.000

a. Dependent Variable: Commitment

One limitation of this study and future research opportunity is that we only looked at two satisfaction response constructs that are important to commitment to the outcome. To introduce additional constructs, possibly using commitment as both a dependent and independent variable, structural equation modeling could study the effects of additional YST (and TTM) constructs.

6 Conclusion

This study aims to bridge the gap of the few studies that measure the commitment to the outcome of a collaborative work practice. Specifically, we found that perceived magnitude of net value is the strongest predictor of commitment followed by satisfaction with outcomes, and satisfaction with process. These findings are important for two

reasons. First, the perceived value of a collaborative work practice represents a strong perception that can lead to acceptance, commitment, and implementation of outcomes. Second, when users are dissatisfied with a system, the users tend to discontinue system use, can erode IS/IT budgets, and can reduce customer retention in outsourcing and consulting [14]. This understanding can help designers of collaborative work practices and other collaborative projects.

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