Why Do We Keep Using A Process Modelling Technique?

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Abstract

In line with the increased popularity of process modelling, a plethora of process modelling techniques has been proposed over time. Yet, only a few have been widely accepted by practitioner communities. This in turn leads to the question of the drivers of continued acceptance (continuance) of process modelling techniques. While researchers have extensively studied continuance and acceptance of information systems, to date, there appears to be no study that has investigated the issue of process modelling technique continuance. This paper addresses this gap by identifying from prior research theories that purport to explain the formation of an intention to continue using a process modelling technique and integrating them in a hybrid research model. We subject the theoretical model to an empirical test with process modellers. The resulting model provides an in-depth understanding of a process modeller's continuance decision.

Keywords

Process modelling, user evaluation, technology acceptance, expectation-confirmation theory

Introduction

An increasing demand for a more disciplined approach towards Business Process Management (BPM) has been reported (Gartner Group, 2007), which in turn has triggered related academic and commercial work aiming towards, *inter alia*, advanced business process modelling. Process modelling is an approach for visually describing how businesses conduct their operations and typically includes graphical depictions of at least the activities, events/states, and control flow logic that constitute a business process (Curtis *et al.*, 1992). It is widely used within organizations as a method to increase awareness and knowledge of business processes, and to deconstruct organizational complexity. Many studies have shown the relevance of process modelling to BPM initiatives, e.g., (Davenport, 1993). The recent introduction of legislative frameworks such as the Sarbanes-Oxley Act further contributed to the increasing interest in business process modelling. In fact, process modelling has become one of most popular reasons to do conceptual modelling overall (Davies *et al.*, 2006). Correspondingly, over time, a wide selection of process modelling techniques has been designed, ranging from simple flowcharts and typical business modelling techniques to advanced variants of Petri nets with high expressive power.

Despite the proliferation of process modelling techniques, however, only a few have been widely accepted and continuously used by the BPM community. Actual practice informs us that certain process modelling techniques have achieved high levels of adoption and dissemination in modelling practice, e.g., Event-driven Process Chains (Scheer, 2000) or BPMN (BPMI.org and OMG, 2006), while others reside as an object predominantly of interest to academic scholars.

The corresponding question of the *success* of process modelling techniques has raised surprisingly little interest amongst BPM researchers. While some researchers have conducted studies to investigate the strengths and weaknesses of specific process modelling techniques and have shown that techniques differ quite significantly in their representational capabilities (Rosemann *et al.*, 2006), in their support for workflow patterns (van der Aalst *et al.*, 2003) or in their capacity to fulfil certain syntactic and/or semantic correctness criteria such as relaxed soundness (Verbeek *et al.*, 2007), the findings from these studies provide only little explanation of actual success, adoption, acceptance or continued usage patterns. In IS research, however, these studies belong to the core research directions, e.g., (Goodhue, 1995; Bhattacherjee, 2001). One of the most interesting and widely used measure for success has become known as the notion of *continued acceptance* (or continuance), viz., the decision of an individual to continue using an artefact on a prolonged basis (Bhattacherjee, 2001). Continuance has over the last years emerged as a both stimulating and relevant phenomenon of interest in IS research in general, e.g., (Kim and Malhotra, 2005; SeJoon *et al.*, 2006; Premkumar and Bhattacherjee, 2008). Yet, the question of the continuance decision has not at all been addressed in the process modelling community.

Accordingly, the *imperative of our research* is to move forward research in the BPM community by extending research on process modelling techniques beyond syntactic and semantic investigations towards further consequential variables of interest. More specifically, we seek to develop an understanding of the continued use of process modelling techniques by individual modellers. The study focuses on the reasons why individual process modellers are willing to continue to use a process modelling technique after its initial adoption, which, often, is an organizational decision. Ultimately, however, individual modellers are the ones who use a technique and evaluate its acceptability. Prior studies, e.g., (Orlikowski, 1993), have suggested that individual modellers do in fact sometimes decide not to use a modelling technique even if there has been an organizational decision to adopt it. If it were mandatory for individuals to use a modelling technique that they are unwilling to use, their work morale would be worsened, which in turn would negatively impact on their productivity (Frey, 1993). Therefore, it is imperative to develop a comprehensive appreciation of the continuance intention in order to be able to develop an informed opinion about the long-term viability and eventual success of a process modelling technique. Understanding how and why individuals accept or reject techniques after initial exposure would contribute to understanding the more general phenomenon of post-adoption usage behaviour, an area of IS research that has so far attracted only limited attention (Jasperson *et al.*, 2005).

The specific *aim of this paper* is to investigate empirically whether existing IS theories on acceptance and continuance can be used to provide an explanation of the factors that affect an individual process modellers' continuance intention, i.e., whether existing IS theories are applicable to the process modelling domain also. We proceed as follows. In the next section, we recapitulate existing theories of IS acceptance and continuance and discuss their applicability to the process modelling domain. We combine these theories in a theoretical model of process modelling technique continuance. We then report on design, conduct and findings of an empirical test of this model using 41 BPMN process modellers and discuss the results of the empirical validation. We conclude this paper with a summary of contributions and an outlook to further research.

Relevant Theories and Concepts

While there has been little research in the BPM community on process modelling success, acceptance or continued use – a good example of such studies is described in (Bandara *et al.*, 2005), in the IS research discipline, a wide variety of theories exist to explain and measure related phenomena, including the theory of reasoned action (Ajzen and Fishbein, 1980), the unified theory of acceptance and use of technology (Venkatesh *et al.*, 2003), the Technology Acceptance Model (TAM) (Davis, 1986, 1989) and expectation-confirmation theory (ECT) (Bhattacherjee, 2001). Among these, in particular TAM and ECT have emerged as two strong theoretical perspectives on the continued acceptance intention, e.g., (Kim and Malhotra, 2005). TAM is widely accepted as a powerful tool to represent the determinants of users' adoption and usage decisions across a variety of IS. ECT is a relatively new theoretical model that was developed specifically to understand users' continued usage behaviour. Both models suggest different perspectives on how and why individual come to continually use IS-related artefacts, which motivates our selection for these theories. TAM uses beliefs towards intrinsic characteristics of an artefact to determine the formation of an intention to continue to use the artefact. ECT, on the other hand, explains post-adoption behaviour with respect to its match with pre-adoption beliefs and expectations. We will in the following introduce these theories and then present a hybrid model of continuance.

Technology Acceptance Model

The Technology Acceptance Model (TAM), (e.g., Davis, 1989; Davis *et al.*, 1989), is an immensely popular IS theory that describes how users come to accept and use an IS artefact on a prolonged basis. The model suggests that when users are presented with an IS artefact two primary factors influence their decision about how and when they will use it. Perceived usefulness (PU) is the degree to which a person believes that using a particular artefact would enhance his or her job performance while perceived ease of use (PEOU) constitutes the degree to which a person believes that using a particular artefact would be free from effort. Related studies have found that PU and PEOU directly influence an individual's intention to (continue to) use an IS artefact (Davis, 1989; Davis *et al.*, 1989). Also, PEOU was found to be a causal antecedent of PU (Venkatesh and Davis, 1996).[1]

TAM has been identified as a very commonly employed theoretical framework for studying IS acceptance (Lee *et al.*, 2003). In fact, the extensive amount of research related to TAM has reportedly made it one of the most influential IS theories overall. King and He (2006) found in their meta-analysis of TAM that, despite of its recent extensions, for example, the TAM2 model (Venkatesh and Davis, 2000), and revisions, for example, the UTAUT model (Venkatesh *et al.*, 2003), primarily the classical model is of high reliability and explanatory

[1] It should be noted that some related studies have found the support for the relationship between PEOU and PU to be inconsistent and sometimes of less significance. An explanation for this is speculated to reside in the fact that prolonged exposure to an IS artifact remedies potential concerns about the ease of its use Chau, P.Y.K. (1996) An Empirical Assessment of a Modified Technology Acceptance Model, *Journal of Management Information Systems,* 13, 185-204.

power and obtains high levels of robustness. It would appear then that TAM in its original form is a suitable starting point for explaining continuance of process modelling techniques. Its main premise, namely users will choose to accept an IS artefact if it proves to be useful and easy to use, has been shown to hold in a variety of contexts, such as for different systems (for example, email, GSS), in different situations (for example, culture, over time), with different moderating variables (for example, gender, organizational size), and with different subjects (for example, students, knowledge workers, managers). We would expect the same relationships to hold for process modelling domains also.

Though TAM is technically a model of initial acceptance, it has also been used to examine post-adoptive usage, i.e., continued use. Recent longitudinal studies, e.g., (Venkatesh and Davis, 2000; Kim and Malhotra, 2005), have shown that TAM is adequate in its explanatory power for examining post-adoption intention and/or continuance behaviour.

Expectation-Confirmation Theory

TAM is, in its essence, a theoretical and cross-sectional model that predicts IS acceptance based on user perceptions. However, post-adoption behaviour that arises out of users' direct first-hand experience with the target IS, are not explicitly included in TAM. Expectations-confirmation theory (ECT), on the other hand, presents a different perspective on IS continuance (Bhattacherjee, 2001). ECT posits that initial pre-usage expectations, coupled with perceived performance, lead to post-adoption satisfaction, which in turn determines the formation of the intent to continue using the artefact under observation. This effect is mediated through positive or negative confirmation between the expectations and the perceived performance. If an artefact outperforms expectations (positive confirmation) post-adoption satisfaction will result. If an artefact falls short of expectations (negative confirmation) the user is likely to be dissatisfied.

Perceived performance is often conceptualized as individual beliefs about the use of the artefact (Bhattacherjee, 2001). As a meta analysis of TAM studies shows (King and He, 2006), perceived usefulness is the only salient belief that has consistently been demonstrated to influence user intentions across several stages of IS use. Accordingly, perceived performance in the original ECT has in the IS context repeatedly been conceptualized as PU, e.g., (Hsu *et al.*, 2004). For instance, it has been found that satisfaction is influenced by perceived usefulness and the confirmation of expectation from prior IS use (Bhattacherjee, 2001).

Expectations reflect anticipated behaviour (Churchill Jr. and Surprenant, 1982). In a post-adoption setting, the concept of *initial* expectations bears little merit to a study. Pre-usage expectation is typically based on others' opinions or information disseminated through mass media. What is more of interest to a study of post-adoption behaviour is whether the initial expectations are confirmed through initial and continued exploitation of the artefact, and whether this would lead to satisfaction. Hence, expectation as a construct has often been excluded from ECT models (Bhattacherjee, 2001).

ECT gives a perspective on process modelling technique continuance different to that of TAM in that it focuses more on external factors such as pre-usage expectations. As organizations traditionally exhibit a great deal of control over pre-usage conditions in process modelling (for instance, the initial selection of a technique, its market penetration, communication through social channels, facilitating resources such as tool support and training capacities), it would seem plausible that it is essential to develop an understanding of how the positive (dis-) confirmation of such expectations towards a process modelling technique would lead to a satisfying use of the technique and how satisfaction in turn would affect the continuance intention. As a practical rationale for the applicability of ECT consider the example of the recently proposed BPMN process modelling technique (BPMI.org and OMG, 2006). The extensive amount of media announcement, the related standardization processes and the enormous vendor support have motivated a significant number of organizations to rapidly adopt their modelling environments to incorporate BPMN. This phenomenon can in theory be described as the building of expectations in pre-usage phases since, at that time, no reported studies on the usability or suitability of BPMN for process modelling were available.

A Hybrid Model of Process Modelling Technique Continuance

ECM and TAM focus on different aspects of user perceptions, with TAM being more utility-driven and ECT being more expectation-driven. The question that emerges from this observation is whether a combined model of TAM and ECT would hold even better explanatory power. Hence, we speculate whether a hybrid model may provide a more complete understanding of continued acceptance behaviour relative to the more parsimonious ECM or TAM.

And in fact, it was found in prior empirical studies (Kim and Malhotra, 2005; SeJoon *et al.*, 2006; Premkumar and Bhattacherjee, 2008) that TAM and ECT appear to be not only conceptually complementary but also that the hybrid model outperforms each of the two individual models. These findings provide strong initial evidence that, in the domain of process modelling, the hybrid model would also be a most adequate model for

continuance. Accordingly, Figure 1 gives the research model underlying the present study. The model posits that the formation of the intent to continue using a process modelling technique is primarily dependent on two factors:

(a) whether users form a positive belief about the actual use of the technique, viz., whether they find it useful and easy to use in actual process modelling practice and

(b) whether users are able to confirm (or disconfirm) initial expectations from the pre-usage phase about the technique.

More specifically, we expect that satisfaction, ease of use and usefulness are direct determinants of continuance. The satisfaction construct yields the potential to capture attitudes and beliefs about a technique that stretch both usage patterns (e.g., the perceived usefulness) and pre-usage patterns (e.g., whether or not externally or institutionally driven expectations are confirmed). PU, as the most consistent salient belief about usage in IS acceptance studies yields the capacity to capture performance beliefs (e.g., whether or not using a technique actually improves the quality of the process models or the overall success of the process modelling initiative, or exhibits effectiveness and efficiency gains).

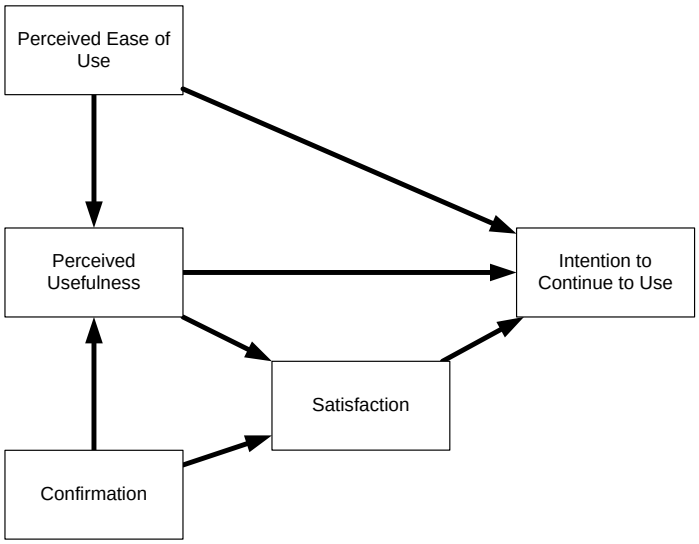

Figure 1: Research Model

An Empirical Test

So far, we have described and discussed the theoretical conceptualization of a model to explain process modelling technique continuance. The model has been established by integrating components from TAM and ECT, the two most prominent theories of IS continuance. At this stage of the research process, however, the model can only be *a priori* given the absence of empirical validation. Accordingly, we started data collection to empirically test our model through cross-sectional survey research, which is traditionally a typical method for testing models in IS (Pinsonneault and Kraemer, 1993). The population of interest for this study includes process modellers who have knowledge of a certain process modelling technique, viz., BPMN. Users of this technique have been selected because BPMN to-date is expected to become the up-and-coming standard technique for process modelling over the next years and as such a case of high practical relevance.

Design

In designing the survey, attention was paid to follow a rigorous scale development procedure for designing the measurement inventory for the theoretical constructs to be tested. In carrying out the procedure for devising scales for the constructs of the research model we followed the methodological procedures firstly prescribed by Davis (1989) and later extended and revised by Moore and Benbasat (1991). For the sake of brevity we omit a discussion of the scale development procedure and instead refer the reader to (Recker and Rosemann, 2007) where we discuss in detail this procedure.

We sought to measure the five constructs PU, PEOU, Confirmation (Con), Satisfaction (Sat) and Intention to Continue to Use (ItU). Related items were operationalised using 7-point Likert scales, which is the traditional way of measuring attitudes and behaviour (Likert, 1932). In the definition of our measurement items, in accordance to (Ajzen and Fishbein, 1980), we included in the item specification a specific process modelling technique, BPMN (BPMI.org and OMG, 2006), which was the technique of use in the survey population, in

order to make the item more tangible and understandable.[2] Table 1 gives the resulting scales for the constructs of the research model. All of the scales of the latent constructs have been adopted from well-validated previous scales and modified to fit the process modelling domain, as described in (Recker and Rosemann, 2007).

Table 1: Measurement items for latent constructs

Construct	No	Item	Adopted from
PU	PU1	Overall, I find BPMN useful for process modelling.	(Moore and Benbasat, 1991)
	PU2	I find BPMN useful for achieving the purpose of my process modelling.	(Moore and Benbasat, 1991)
	PU3	I find BPMN useful for meeting my process modelling objectives.	(Moore and Benbasat, 1991)
PEOU	PEOU1	I find it easy to model processes in the way I intended using BPMN.	(Moore and Benbasat, 1991)
	PEOU2	I find learning BPMN for process modelling is easy.	(Moore and Benbasat, 1991)
	PEOU3	I find creating process models using BPMN is easy.	(Moore and Benbasat, 1991)
Con	Con1	Compared to my initial expectations, the ability of BPMN to help me model processes was much better than expected.	(Bhattacherjee, 2001)
	Con2	Compared to my initial expectations, the ability of BPMN to help me achieve the purpose of my process modelling was much better than expected.	(Bhattacherjee, 2001)
	Con3	Compared to my initial expectations, the ability of BPMN to help me meet my process modelling objectives was much better than expected.	(Bhattacherjee, 2001)
Sat	Sat1	I feel extremely contented about my overall experience of using BPMN for process modelling.	(Bhattacherjee and Premkumar, 2004)
	Sat2	I feel extremely satisfied about my overall experience of using BPMN for process modelling.	(Bhattacherjee and Premkumar, 2004)
	Sat3	I feel extremely delighted about my overall experience of using BPMN for process modelling.	(Bhattacherjee and Premkumar, 2004)
ItU	ItU1	If I have access to BPMN I expect I will continue to use it for process modelling.	(Moore and Benbasat, 1991)
	ItU2	My intention is to continue to use BPMN for process modelling.	(Moore and Benbasat, 1991)
	ItU3	In the future, I would prefer to continue to use BPMN instead of using another process modelling technique for process modelling.	(Moore and Benbasat, 1991)

Participants

The population of interest for this study included process modellers with knowledge of, and experience with, BPMN. Participants were two-fold. 28 post-graduate information systems students majoring in business process management with at least one BPMN process modelling course participated in the survey. Furthermore, 13 business process management scholars researching phenomena related to process modelling with BPMN responded. Both populations consist of individuals with high modelling technique knowledge but without high levels of business domain knowledge. It was the explicit design choice to select participants without domain knowledge, which might have confounded the results (Gemino and Wand, 2004). The students filled out a paper-based version of the survey while the researchers filled out the identical web-based version. A subsequent ANOVA procedure indicated that the form of the survey instrument did not affect results. Participation was voluntary and some incentives were provided (e.g., lottery draw for a free book, access to study results).

Scale Validation

Construct validity for the five measurement scales (PU, PEOU, satisfaction, confirmation and intention to continue to use) was assessed via confirmatory factor analysis (CFA) using LISREL 8.80 (Jöreskog *et al.*,

[2] The inclusion of BPMN in the item specification was thus done for illustration purposes only, the items can easily be adapted to other techniques, e.g., BPEL, IDEF3, YAWL, EPCs or Petri nets.

2001). Each scale item was modelled as a reflective indicator of its hypothesized latent construct. The five constructs were allowed to co-vary in the CFA model. Table 2 gives the results.

Table 2: Scale validation results

Construct	Item	Item loading	Reliability	AVE
	PU1	0.818		
PU	PU2	0.726	0.912	0.879
	PU3	0.605		
	PEOU1	0.774		
PEOU	PEOU2	0.831	0.948	0.926
	PEOU3	0.770		
	Con1	0.840		
Con	Con2	0.861	0.897	0.864
	Con3	0.810		
	Sat1	0.824		
Sat	Sat2	0.733	0.918	0.887
	Sat3	0.728		
	ItU1	0.671		
ItU	ItU2	0.717	0.912	0.885
	ItU3	0.606		

As can be seen from Table 2, three standard indices for validity and reliability were used (Fornell and Larcker, 1981), namely all indicator factor loadings (λ) should be significant and exceed 0.6, construct reliabilities should exceed 0.80 and average variance extracted (AVE) by each construct should exceed the variance due to measurement error for that construct (i.e., AVE should exceed 0.50). Table 3 gives the corresponding factor correlation matrix. Both tables show that the used scales all well exceed recommended validity and reliability thresholds.

Table 3: Factor correlation matrix

Construct	PU	PEOU	Con	Sat	ItU
PU	1.000				
PEOU	0.576	1.000			
Con	0.553	0.606	1.000		
Sat	0.291	0.360	0.496	1.000	
ItU	0.462	0.499	0.604	0.400	1.000

Results and Discussion

A structural equation modeling analysis was performed using LISREL 8.80 (Jöreskog *et al.*, 2001). Objectives of the structural equation modelling exercise were two-fold: First, to compare the hybrid model with the more parsimonious models of TAM and ECT on which it was based and second, to validate the proposed research model. Structural equation modelling has been suggested not only as being appropriate for comparing alternative models but also as being useful for examining theoretically justified models such as the one in this study (Bentler and Bonett, 1980; SeJoon *et al.*, 2006). As the data was ordinal, the Diagonally Weighted Least Squares (DWLS) method for Polychoric correlation matrices was used (Jöreskog *et al.*, 2001).

Comparing the Research Model to the Original TAM and ECT

For comparing our proposed research model to original TAM and ECT, an identical set of fit indices e.g., (Bhattacherjee, 2001), was used to examine the fit of the models (see Table 4).

Table 4: Fit indices for TAM, ECT and the research model

Fit index	Recommended value	TAM	ECT	Research model
NFI	≥0.90	0.95	0.97	0.93
NNFI	≥0.90	0.97	1.02	0.97
CFI	≥0.90	0.98	1.00	0.98
SRMR	≤0.05	0.034	0.053	0.048
RMSEA	≤0.08	0.13	0.0	0.0
χ^2 (*df, p*)	-	27.96 (*24, 0.26*)	52.26 (*49, 0.35*)	112.68 (*82, 0.014*)

For all models, all the indices suggested adequate fit, except for RMSEA, where the recommended value of 0.08 was exceeded by TAM, and standardized RMR (SRMR), where the recommended value of 0.053 was exceeded by ECT. These cases suggest that TAM and ECT both contain at least some systematic error that cannot be

explained by the proposed latent constructs and relationships (i.e., there is more to process modelling technique continuance than what either TAM or ECT can explain). In contrast, the hybrid research model meets the recommended thresholds for SRMR and RMSEA, which suggests that the hybrid model is better than TAM or ECT in terms of data fit. To provide further evidence for this suggestion, additionally, the relative χ^2/df ratio was considered, which should be lower than 3 (Bentler and Bonett, 1980). Two further indices, Akaike Information Criterion (AIC, Akaike, 1974) and Consistent AIC (CAIC, Bozdogan, 1987), were also used to compare the three models. AIC and CAIC are methods for comparing alternative models to determine which model explains the given data better (Hair *et al.*, 1995), and have previously been applied in similar studies, e.g., (SeJoon *et al.*, 2006). Table 5 gives the comparison results.

Table 5: Comparison of models

Model	R^2 for ItU	AIC	CAIC	χ^2 (*p*)	χ^2/df
TAM	.65	81.19	138.17	27.96 (*0.26*)	1.17
ECT	.35	101.65	177.63	52.26 (*0.35*)	1.07
hybrid	.69	154.37	257.49	112.68 (*0.014*)	1.37

Table 5 shows that the hybrid model in fact outperforms both ECT and TAM. Its explanatory power when considering ItU is stronger, the goodness-of-fit indices are (slightly) better and both AIC and CAIC are considerably higher. Also, the hybrid model is the only model in the test whose χ^2 test statistic is significant.

Validating the Hybrid Model

We suggested above that the combined model of TAM and ECT would hold even better explanatory power that individual TAM or ECT based on the argument that these models are in their essence conceptually complementary. Since ECM and TAM originally focused on different aspects of user perceptions, we posited that by combining these two models a more complete understanding of continued acceptance behavior relative to the more parsimonious ECM or TAM can be provided. Figure 2 presents the hybrid model results and the emergent causal paths between the model constructs.

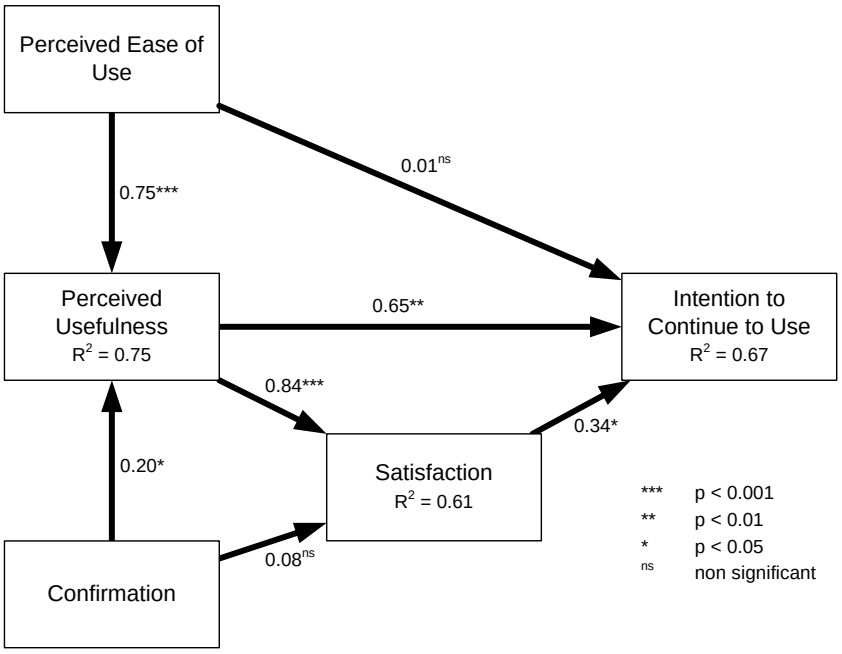

Figure 2: Summary of hybrid model results

The model explains 67% of the variance in users' intentions to continue usage, 61% of the variance in satisfaction with a technique and 75% of the variance in PU. The hypothesized paths are significant except for PEOU-ItU and confirmation-satisfaction. In fact, the impact of PEOU on ItU is barely existent and insignificant. This finding is in line with previous findings. Chau (1996), for instance, noted that, over time, first-hand utility would strongly outperform potential concerns about easiness. In the process modelling domain then it would appear that it is the question of how effective the technique is for developing graphical models of business processes and not so much the question whether the modeller can do so easily, that drives the continuance decision. Yet, the strong impact of PEOU on PU ($\beta = 0.75$) suggests that process modellers would find a technique (viz., BPMN) useful because they perceive it as easy to use. This in turn implies that easiness of use is a necessary but not sufficient prerequisite for technique long-term viability as measured by continued use. As

for confirmation-satisfaction, it would appear that the confirmation effect is fully mediated by perceived usefulness, which boasts a strong impact ($\beta = 0.84$) on satisfaction. This suggests that in the area of process modelling, first-hand usage experiences have in fact a stronger influence on user satisfaction than the positive (dis-) confirmation of initial expectations. This implies that even if pre-usage expectations may have been positively (dis-) confirmed, satisfaction with the use of a process modelling technique is primarily determined by first-hand utility (i.e., usefulness) over and above a post-usage reflection on initial expectations. Prior literature supports this view. Fazio et al. (1978), for instance, found that the impact of external or facilitating factors (which could lead to pre-usage expectations) diminishes over time and instead first-hand experiences and direct utility dominate continuance intentions. This would appear to hold also in the process modelling domain.

In conclusion, our empirically validated research model suggests that the formation of the intent to continue using a process modelling technique is primarily dependent on two different factors:

1. whether users form a positive belief about the actual use of the technique, viz., whether they find it useful for accomplishing process modeling tasks, and
2. whether users are able to positively confirm initial expectations (or disconfirm negative expectations) that were built up from the pre-usage and initial adoption phase of the technique and hence feel satisfied with the technique.

More specifically, our findings confirm that satisfaction and usefulness are direct determinants of process modeling technique continuance. As we speculated above, we believe that our results show that the satisfaction construct captures opinions about a technique stemming from both first-hand utility and from previously built-up expectations prior to use. The usefulness of a process modeling technique plays a very strong role and suggests that, in fact, user evaluations are based on whether a technique supports the execution of tasks such as modeling business operations, designing process improvement ideas or supporting process analysis schemes.

In conclusion, it would appear that researchers seeking to establish knowledge of acceptance, continuance and usage behaviour in the process modelling domain can enjoy several practical research advantages (e.g., pre-validated scales, sound theoretical base, previous empirical findings) that stem from a referral to established theories from related disciplines, such as, in our case, IS research.

Contributions

In this paper we have subjected a hybrid research model based on two existing theories of continuance to an empirical test to ascertain whether the model that is applicable to the study of process modeling technique continued acceptance. We have shown that our research model is in fact very adequate to such a study.

Our research is a significant step forward in the process modelling research community. First, our research complements the comprehensive existing body of knowledge on syntactical and semantic issues of process modelling in that we study further success variables of interest. Second, we contribute to the body of knowledge by means of empirical research, the lack of which has repeatedly been noted as a prevailing challenge in process modelling research, e.g., (Krogstie *et al.*, 2006). More specifically, from the empirical perspective we took, this study forms a cornerstone on which knowledge of process modelling technique continuance can be established. By integrating prominent theoretical perspectives in one model of continuance, we have made a significant step toward a more comprehensive understanding of the complexity that relates to practitioner's intention to continuously use a process modelling technique. As such, we have moved towards establishing knowledge about the long-term viability and eventual success of process modelling techniques.

There are some noted limitations associated with our study. Our sample population is small and consists of BPM researchers and students but not practitioners. While some researchers have argued that these populations are adequate proxies for (inexperienced) practitioner bases, e.g., (Gemino and Wand, 2004), we acknowledge our sample population as a limitation. A second limitation can be seen in the fact that have not yet included in our model domain-specific antecedents of continuance behaviour (e.g., process modelling-related factors that would explain why modellers find .a technique easy to use, or the objectives and purposes of the overall process modelling initiative). A third limitation can potentially stem from the selection of theoretical lenses through which we opted to investigate the continued use of process modelling techniques. Especially TAM has sometimes been subjected to criticism related to the appropriateness of its use for understanding acceptance and adoption behaviour, e.g., (Carroll *et al.*, 2003). We seek to mitigate these criticisms by including additional theoretical perspectives into the research model in order to be able to account for aspects of post-adoption behaviour that can not fully be explained through TAM. A fourth limitation is the notable limited sample size, which may have to some extent skewed the results of the empirical validation. However, the sample size was adequate as an initial confirmation of the adequateness of the selected theoretical lenses in the study of post-adoption process modelling technique usage behaviour.

Our forthcoming research will be two-fold. First, we will extend the hybrid model of process modelling technique continuance to identify and include antecedents of the constructs presented here. We seek to ascertain which factors in particular drive perceived usefulness, perceived ease of use and confirmation to establish a comprehensive knowledge on not only *how* but also *why* process modellers would choose to continue to use a particular technique. Several theories exist that can be used to identify such antecedent factors of process modelling technique continuance. For instance, adopting Task-Technology-Fit, e.g., (Goodhue, 1995), to the process modelling domain posits that it is to be expected that how well a process modelling technique supports given process modelling objectives and/or the background skills and knowledge of the modeller using the technique would have an impact on his/her evaluation of the technique. Prior research in related conceptual modelling domains, e.g., (Moody, 1996) also provides evidence that certain characteristics or even habits of modellers influence the way their modelling work is conducted. Second, we will distribute the extended survey across process modelling practitioner communities to obtain a more complete coverage of responses across various types of process modellers. This will allow us to overcome the noted limitation of having restricted our sample to BPM students and researchers.

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