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Functional Forms of Fit: Making the Case for an Asymmetric Perspective

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ABSTRACT

In research disciplines such as organization science and information systems, fit, for example between environmental factors and organizational structure, and between organizational tasks and information systems, plays an important role to explain and predict variables such as organizational performance and user satisfaction. We build on the observation that while different types of fit have been identified, the characteristics that underlie the functional relationships of fit and the respective dependent variables have received less attention. We suggest that two characteristics in particular, (1) continuity versus dichotomy of fit and non-fit, and (2) symmetry of effects, require the attention of researchers who study complex organizational phenomena as part of organizational and information systems research. We suggest that researchers routinely consider asymmetric forms of fit that distinguish over-fit and under-fit and clearly justify their choices of continuous versus dichotomous fit-variables in their research designs. We discuss the implications for fit-related research studies.

Keywords

Task-technology fit, contingency theory, expectation-disconfirmation theory, asymmetric approach

INTRODUCTION

According to Merriam Webster's dictionary, *fit* refers to an object being "adapted to an end or design", "to conform correctly to a shape or size" and "to be in agreement with". Inherent in the literal understanding of fit are two assumptions: First, fit is dichotomous in the sense that fit is either achieved or not achieved (e.g., a glove fits the hand or it does not). Second, the concept of fit is symmetric in the sense that the consequences in a situation where fit is not achieved are independent of the direction (over-fit: glove is too large versus under-fit: glove is too small).

The concept of fit plays an important role as part of research disciplines, such as contingency theory (Van de Ven and Drazin 1985), strategy (Venkatraman 1989), information systems (Iivari 1992), and marketing (Oliver 1977). Fit has been conceptualized as a match between organizational structure and requirements of the organizational context (Lawrence and Lorsch 1967), or the extent to which the need for strategic change relates to actual change (Zajac et al. 2000). A number of different types of fit have been identified, such as fit as congruence, interaction, and profile deviation (Venkatraman 1989). Fit is used by scholars of the theory of task-technology fit and contingency theory to explain and predict performance at the levels of the individual (Goodhue and Thompson 1995), group (Zigurs and Buckland 1998) and organization (Zajac et al. 2000), whereas scholars of expectation-disconfirmation theory use the concept of fit in an effort to explain and predict satisfaction of customers (Oliver 1977) and users (Bhattacherjee 2001a).

In the current paper, we regard fit as an independent construct (i.e., defined elsewhere), and focus our attention on the functional form between fit and its dependent variables, as they have been applied in previous research studies. More specifically, we identify a number of functional forms and examine the underlying assumptions. We suggest that both characteristics that are implied in the literal meaning of the word fit, namely (1) dichotomy of fit and non-fit, and (2) symmetry of the consequences of non-fit, may be insufficient for the analysis of complex organizational phenomena that are typically the focus of organization and information systems research studies.

The first characteristic has in fact been adapted by the literature, albeit mostly implicit, as fit is rarely modeled as a strictly dichotomous variable. More often, fit is conceptualized as a refined and multi-dimensional construct that is the result of a possibly large number of criteria and characteristics, thus, allowing for many different shades of fit (Venkatraman 1989). In addition, many researchers have modeled fit as a continuous variable.

Regarding the second characteristic of symmetry, however, we note that scholars often model fit in its literal sense as a symmetric construct, and irrespective of differences in consequences of over-fit and under-fit. In contrast, common sense tells us that an object that does not conform correctly to a shape or size, and consequently does not fit, may do so because it is too large or too small, whereby the two situations can have very different implications depending on the context: A glove that is too loose to fit a hand may still offer some protection to the owner, whereas a glove that is too tight to fit a hand may not; a vehicle that is too large to fit on a road may prevent the driver from using the road at all, whereas a vehicle that is considered too small may still allow the driver some access, e.g., by use of a sidewalk. In the current paper, we call an *asymmetric* perspective of fit a situation where the implications of over-fit for a dependent variable, such as performance or user satisfaction, are considered to be potentially different from the implications of under-fit. In contrast, we call a *symmetric* perspective of fit a situation where fit is considered to relate to the dependent variable independently of the underlying direction (over-fit versus under-fit).

In our literature review we find that while a number of scholars only focus on "one side of the equation" (e.g., situations of under-fit), others include both sides into the analysis but then calculate an absolute value of fit, treating the consequences of over-fit and under-fit as identical. We maintain that the assumption of symmetry that is often implicit in fit-constructs may have limited the insights that can be gained from research disciplines, such as the theory of task-technology fit and even contingency theory. Moreover, the implied functional relationships between fit and its dependent variables may even have limited the statistical significance in the corresponding research models. We suggest that an asymmetric fit construct often requires comparatively little additional research effort, yet can yield important insights for research and practice. In addition, we suggest that researchers of information systems and organizations apply an asymmetric approach to fit as the default research design, whereas a symmetric approach to fit should only be applied after considerable reflection regarding its adequacy.

LITERATURE REVIEW

Research models of task-technology fit and contingency theory expect high performing organizations to be those that match technologies with the required tasks (Goodhue and Thompson 1995, Zigurs and Buckland 1998), and organizational structure with organizational context (Zajac et al. 2000), respectively. In contrast, expectation-(dis-)confirmation theory is concerned with the implications of matched (and unmatched) user expectations on satisfaction (Oliver 1977). In line with the concept of fit that was laid out earlier, previous approaches to fit can be distinguished according to the extent to which the functional forms of fit and its dependent variables are assumed to be (1) continuous versus discrete, and (2) symmetric versus asymmetric. In some research studies, the assumption of symmetry is implicit, as only under-fit is included in the analysis, but not over-fit. An overview of previous approaches is provided next, followed by a synopsis of the literature that highlights the need to clearly specify the suggested construct of fit.

Fit as a Symmetric and Discrete Variable

Scholars of group support systems developed a theory of task-technology fit that matched the functionality of group support systems with the requirements of group tasks, using task complexity as a key distinguishing factor (Zigurs and Buckland 1998). The idea is that certain types of technology are more suitable to support a particular task than others, whereby combinations of task and technology that are suggested to be a good fit, should result in high group performance, and vice versa. To the extent that this approach measures fit as a discrete variable (fit vs. non-fit) it lends itself to an experimental research design. For example, Zigurs and Buckland (1998) tested their theory with a review of the results of previous experiments on group support systems (Zigurs et al. 1999). Shirani et al. (1999) conducted an experiment to examine the interaction between task structure and technology to support synchronous and asynchronous group communication. Mathieson and Keil (1998) used two systems and two tasks to determine fit for different combinations of task and systems. A symmetric approach was applied given that in order to determine fit, task requirements were checked against the functionality of the technology, but not vice versa. In other words, the focus is on under-fit, namely on the question of "Does the technology provide the functionality that is considered to be important to support a given task?" Over-fit, namely the question of "Does the technology provide functionality that is not needed to support the task?" is not included in the analysis (Figure 1).

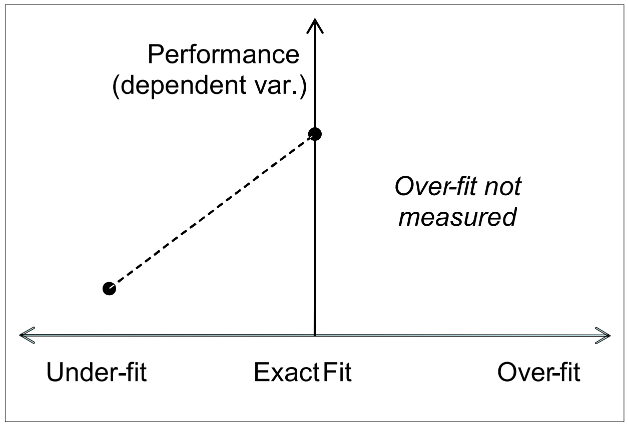

Figure 1. Fit as a symmetric and discrete variable (e.g., Zigurs and Buckland 1998). Fit is determined as a pre-determined match (fit vs. non-fit); only under-fit is included in the analysis and used to measure fit

Fit as a Symmetric and Continuous Variable

A second group of researchers has conceptualized fit as a continuous variable measured directly with Likert-type scales in the survey design. Here, two different approaches can be distinguished. In the first approach, fit is measured based on a number of dimensions. For example, Goodhue and Thompson (1995) used eight distinct factors to describe the fit between a managerial task and supporting information technology: data quality, locatability, authorization, compatibility, ease of use, production timeliness, systems reliability, and relationship with users. In the questionnaire, the respondents were asked to what extent they agreed or disagreed with various statements about the different dimensions of fit. In the statements, indicators of fit were described with terms, such as "appropriate", "sufficiently", "inconsistency", and "difficulty". Again, the focus was on under-fit, whereas over-fit was not included in the analysis. In contrast to the previous approach, however, fit is measured as a continuous variable. We also notice that there is no *optimal* level of fit (i.e., no exact fit). Instead, situations of greater fit are generally assumed to be more desirable and associated with higher user performance than situations of smaller fit. Figure 2 stylizes the functional form of fit as a symmetric and continuous variable.

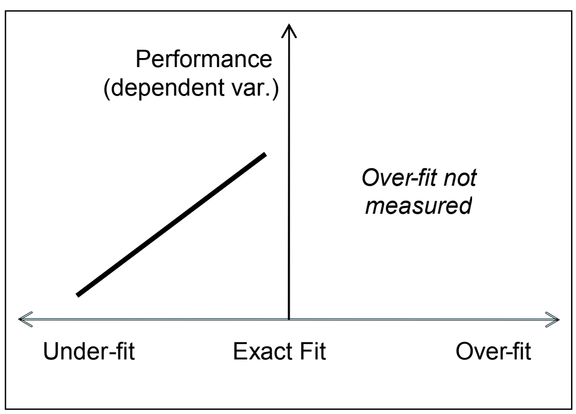

Figure 2. Fit as a symmetric and continuous variable (e.g., Goodhue and Thompson 1995). Fit is measured directly: only under-fit is included in the analysis and used to measure fit; over-fit is not measured

A second example of fit as a symmetric and continuous variable is provided by scholars who operationalized fit based on the interaction between the two variables of task and technology, such as the requirements of a software maintenance task and the functionality of a software maintenance tool (Dishaw and Strong 1999). Here, fit was determined as the product of the standardized values of the two independent variables. While this approach in fact distinguishes conceptually between under-fit and over-fit in its measurement of the individual components, the method that is used to calculate fit, effectively eliminates the signs in the mathematical equations and results in a symmetric variable (Figure 3).

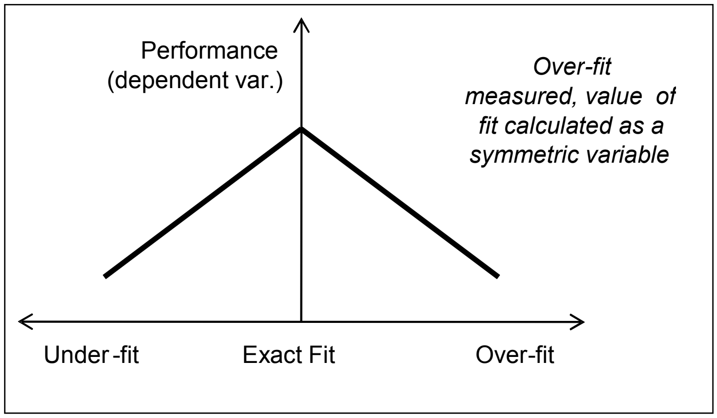

Figure 3. Fit as a symmetric and continuous variable (e.g., Dishaw and Strong 1999). Here, components of both under-fit and over-fit are measured, but the total value of fit is calculated as a symmetric variable

Fit as an Asymmetric and Dichotomous Variable

Some researchers have taken into explicit consideration the possibility of an asymmetric relationship between fit and a dependent variable, whereby both asymmetric and dichotomous approaches have been applied. For example, scholars of strategic management used a contingency model to assess organizational performance implications of various approaches to strategic change (Zajac et al. 2000), whereby fit was calculated as a residual deviation of the suggested need for strategic change as a dichotomous variable (fit vs. non-fit). Even though not originally included in the research model, Zajac et al. (2000) found the direction of non-fit to be empirically relevant as the results differed significantly for situations of excessive versus insufficient strategic change. The study still resulted in a quasi-symmetric functional form of fit as both situations of suggested mis-fit were associated with poorer results than a situation of suggested fit (Figure 4). Similarly, Naman and Slevin (1993) built a normative model to operationalize fit as absolute difference from entrepreneurship, organizational structure and mission strategy perspectives.

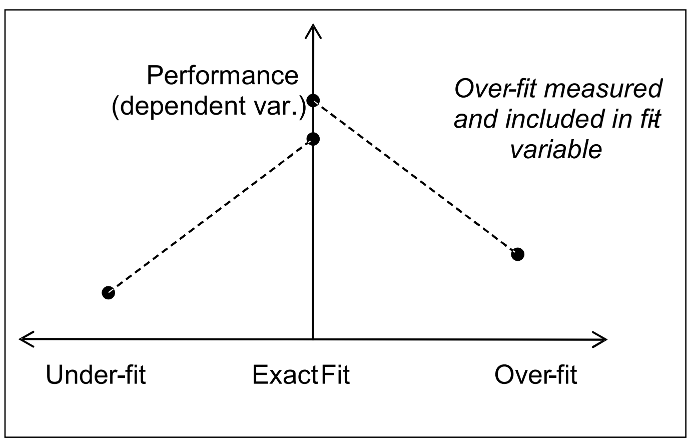

Figure 4. Fit as an asymmetric and dichotomous variable (e.g., Zajac et al. 2000). Fit is measured discretely (fit, non-fit), and with an asymmetric variable that distinguishes between (and yields differing results for) over-fit and under-fit

Fit as an Asymmetric and Continuous Variable

Lastly, a number of research studies have regarded the functional form of fit as an asymmetric and continuous variable, most notably scholars of expectation-(dis-)confirmation theory (Bhattacherjee 2001a, 2001b). More recently, Gebauer and Tang (2007) used an asymmetric and continuous approach to determine fit as the extent to which mobile information systems meet the task needs of mobile users. The researchers measured fit as the difference between user requirements of mobile technologies and actual user-perceived performance of the technologies and applied user satisfaction as the dependent variable. The results show that user satisfaction increased for both situations of under-fit and over-fit, albeit with decreasing margins and becoming statistically insignificant for particularly large values of over-fit (Figure 5).

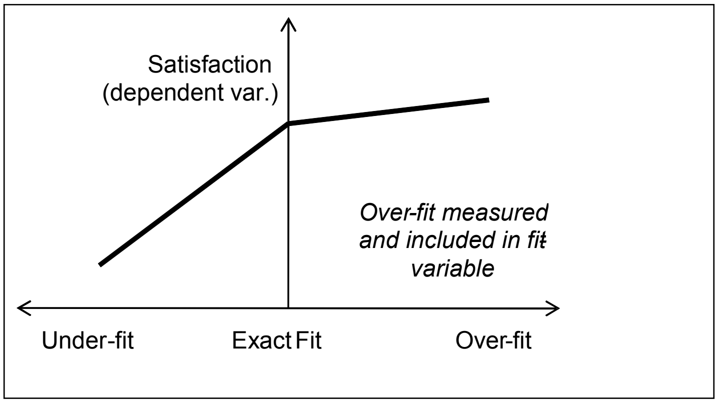

Figure 5. Fit as an asymmetric and continuous variable (e.g., Gebauer and Tang 2007). Fit is measured continuously based on the gap between user expectations and perceived confirmation of technology characteristics; results differ between under-fit and over-fit

ANALYSIS

To gain a more refined understanding about the implications of different functional forms of fit for dependent variables, such as performance and satisfaction, we compared the results of previous research studies (Lipsey and Wilson 2000). We focused our attention on studies by scholars of the theory of task-technology (TTF), contingency theory (CT), and expectation disconfirmation theory (EDT) that have all been applied to information systems research (http://www.fsc.yorku.ca/york/istheory/wiki/index.php/Main_Page). We coded the studies according to research design, operationalization of fit, independent and dependent variables; determined the significance of the relationships; and made an effort to calculate effect size (Table 1).

Effect size measures the magnitude of a treatment effect that has been adjusted for sample size and standard errors, allowing for the comparison of research findings across different studies. It generally ranges from 0 to 1, with higher values suggesting stronger relationships. Even though effect size has been calculated in many different ways, only a small number of methods are typically applied (Lipsey and Wilson 2000).

For situations of continuous dependent variables effect size (ES) can be calculated as the correlation between independent and dependent variables. For studies that do not report the correlation directly, effect size can be approximated based on the t-test values by using the formula below (Hunter and Schmidt 2004; Lipsey and Wilson 2000). This approach is particularly suitable for studies that use regression to examine the relationships between the independent variable (fit) and dependent variables.

$$ES_r = \frac{t}{\sqrt{t^2 + df}}$$

t: Statistic value of t-test; df: degrees of freedom

In the case of dichotomous dependent variables, the focus lies on contrasting the relationship between an independent variable and a dependent variable for different groups. Here the effect size (ES) has been calculated based on standardized means by subtracting the mean of the control group from the mean of the experimental group and dividing this figure by either the control group standard deviation or the pooled standard deviation (Hunter and Schmidt 2004; Lipsey and Wilson 2000). The approach is particularly suitable for experimental studies that report the means (X) and standard errors (S) for both treatment group (E) and control group (C), thus allowing for the comparison of the treatment effects between both groups.

$$ES = \frac{X_E - X_C}{S_x}$$

X_E: mean of treatment group; X_C: mean of control group; S_x: standard deviation of the control group or the pooled standard deviation

Table 1 displays the results of the literature analysis. We note that a number of studies that applied a symmetric and continuous approach to fit reported the relationships with the dependent variables to be statistically not significant (n.s.) (e.g., Goodhue et al. 2000, D'Ambra and Rice 2001, and Lee et al. 2007). In Goodhue et al. (2000), the relationships between user evaluation of data consistency and accuracy, and the relationship between the user evaluation of adequacy of training and time-to-complete were not significant. In D'Ambra and Rice's (2001) study, four out of nine aspects of fit had a statistically non-significant relationship with the dependent variable of performance. In Dishaw and Strong's (1998) study fit, calculated as interaction between task and technology, did not result in statistically significant relationships with actual tool usage and perceived usefulness. Effect sizes ranged from close to zero to 0.74.

Among the studies that adapted an asymmetric approach, Zajac et al. (2000) found that the direction of fit (under-fit and over-fit) moderated the relationships between the absolute value of fit and performance. Both Junglas and Watson (2003) and Gebauer and Tang (2007) reported differences of the results for under-fit, over-fit, and ideal fit, whereby the results for over-fit situations showed weaker effects than situations of under-fit, indicating a convex curve. Stronger results were reported by scholars of expectation-(dis-)confirmation theory who seek to explain user satisfaction as a result of (dis-)confirmed expectations (Susarla et al. 2003; Bhattacherjee 2001a; Bhattacherjee 2001b). Here, research results showed highly significant empirical results in combination with high effect sizes (i.e., steeper, yet still essentially convex functional curves).

Table1. Results of Literature Synthesis

Reference	Theory[1]	Functional Form of Fit	Fit Measures	Dependent Variable	Statistics	P-Value	Effect Size
Zigurs et al. 1999	TTF	Symmetric, discrete	Task and Technology characteristics (pre-determined)	Task performance	Various (meta-analysis)	0.04	NA
Mathieson and Keil 1998	TTF	Symmetric discrete	Task*Technology (pre-determined)	Performance	0.98	<0.001	0.26
				Perceived Ease of Use	0.72	<0.001	0.18
Shirani et al. 1999	TTF	Symmetric discrete	Task*Technology (pre-determined)	basic ideas	0.53 (F)	0.47	0.21
				Inferential ideas	1.21 (F)	0.27	0.32
				total ideas	1.61 (F)	0.21	0.37
Goodhue et al. 2000	TTF	Symmetric continuous	Task*Technology (predetermined)	time-to-complete	-5.22	<0.001	0.31
				accuracy	0.13	<0.05	0.18
			user evaluation for consistency	time-to-complete	1.00	<0.001	0.26
			user evaluation for training	accuracy	-0.13	n.s.	0.17
D'Ambra and Rice 2001	TTF	Symmetric continuous	F1 training	Performance	0.02	n.s.	0.02
			F2 interests		0.29	<0.001	0.29
			F3 Information		0.31	<0.001	0.31
			F4 shopping cost		0.30	<0.001	0.30
			F5 difficult information		0.35	<0.001	0.35
			F6 fun		0.29	<0.001	0.29
			F7 social influence		0.10	n.s.	0.10
			F8 identity control		0.13	n.s.	0.13
			F9 use control		0.17	n.s.	0.17
Lim 2000	TTF	Symmetric	Task*Presentation	Perceived	10.48 (F)	<0.001	0.74

[1] CT: contingency theory; TTF: theory of task-technology fit; EDT: expectation-disconfirmation theory

		continuous	(pre-determined)	Equivocality level			
Dishaw and Strong 1998	TTF	Symmetric continuous	production fit	actual usage	0.45	<0.01	0.45
			coordination fit		0.33	<0.05	0.33
Dishaw and Strong 1999	TTF	Symmetric, continuous	Task*Technology (interaction)	actual usage	0.11	n.s.	0.09
Goodhue and Thompson 1995	TTF	Symmetric, continuous	Eight dimensions to measure fit directly	performance	Four out of 8 factors significant: 0.11, 0.24, 0.12, -0.12	0.04, 0.0001, 0.004, 0.01	0.37
Lee et al. 2007	TTF	Symmetric, continuous	Eight dimensions to measure fit directly	recruiting new contracts	One out of 8 factors significant 0.365	<0.001	0.55
				customer service	One out of 8 factors significant 0.489	<0.001	0.66
				tax and legal information services	Three factors out of 8 significant 0.354; 0.205; 0.163	<0.001;0.005;0.044	0.61
Zajac et al. 2000	CT	Asymmetric, dichotomous	Residual * Type of deviation	return on asset	-0.0095	<0.05	0.01
				organizational death	4.1645	<0.05	0.01
Junglas and Watson 2003	TTF	Asymmetric, dichotomous	Mapping of task requirements and technological functionality	perceived usefulness	NA	Under-fit significantly different than ideal fit and over-fit	NA
				Perceived ease of use			
Gebauer and Tang 2007	TTF/EDT	Asymmetric, continuous	Difference between user requirements and perceived performance	Satisfaction	Two out of 5 factors significant, 0.25, 0.20	<0.05	0.19
Susarla et al. 2003	EDT	Asymmetric, continuous	Disconfirmation of user expectations	Satisfaction	-0.437	<0.001	0.29
Bhattacherjee 2001a	EDT	Asymmetric, continuous	Confirmation of user expectations	Satisfaction	0.59 (C)	<0.05	0.59
Bhattacherjee 2001b	EDT	Asymmetric, continuous	Confirmation of user expectations	Satisfaction	0.659	<0.001	0.26

DISCUSSION

Among the studies that we reviewed, the results of several of the asymmetric approaches are statistically significant and report differing effects of over-fit and under-fit. In general, the effect sizes of fit on user satisfaction – as applied by scholars of expectation/dis-confirmation theory – appear to be greater than the effect sizes of fit on performance variables – as applied by scholars of contingency theory and the theory of task-technology fit (not surprising, given the difference in dependent variable). In contrast, however, several of the research studies that used a symmetric approach to fit reported insignificant results regarding the association between fit and its dependent variables, whereby effect sizes varied widely (Table 1).

In general, the explicit separation of over-fit and under-fit can help to uncover relationships that may otherwise be obscured by the omission of over-fit effects and by the mixing of over-fit and under-fit, and thus provide new insights regarding the explanation and prediction of the various dependent variables. Furthermore, a more explicit consideration of over-fit and under-fit may – over time – result in the development of practical guidelines for the selection of fit-constructs that can then help scholars set up effective research designs. To date, there is little systematic guidance of how to measure fit in a given research situation.

A number of studies that reported statistically non-significant associations between fit and dependent variables measured fit directly based on user-responses to survey questions. For the most part, however, there was no distinction between over-fit and under-fit effects, whereby over-fit in particular was typically not included in the questions. Had measures of both over-fit and under-fit been included in the survey instruments, the results may have yielded differences between both types of fit and possibly increased significance levels. In addition, a number of studies measured fit based on a rather sizeable number of dimensions (e.g., Goodhue and Thompson 1995), an approach that tends to produce statistically non-significant results in at least some of the dimensions. Statistical significance notwithstanding, multi-dimensional studies may prove to be helpful to identify dimensions that are particularly well suited for the development of situation-specific fit-constructs.

In research studies that calculate fit as the interaction between task and technology characteristics, an asymmetric perspective can be achieved by using a dummy variable to code over-fit and under-fit effects. This approach was applied by Zajac et al. (2000) who used "deviation type" to distinguish over-fit and under-fit effects. For excessive strategic change the dummy variable was coded as 1 (over-fit), whereas for insufficient strategic change the dummy variable was coded as 0 (under-fit).

In our analysis, the effect sizes that were reported in studies that used symmetric approaches to fit ranged from 0.09 to 0.74. As depicted in Figure 6, the larger the effect-size on the under-fit part of the slope, the larger the room for error on the over-fit part of the slope. Let us assume the slope coefficient for the under-fit is β. The maximum difference between a perfectly linear and a perfectly symmetric approach would then be 2β (shaded area in Figure 6). Consequently, the larger β the larger the potential error from wrongly assuming a symmetric association between under-fit and over-fit can be. In Figure 6, the broken line symbolizes an assumed to be realistic slope somewhere between the perfectly linear and perfectly symmetric lines.

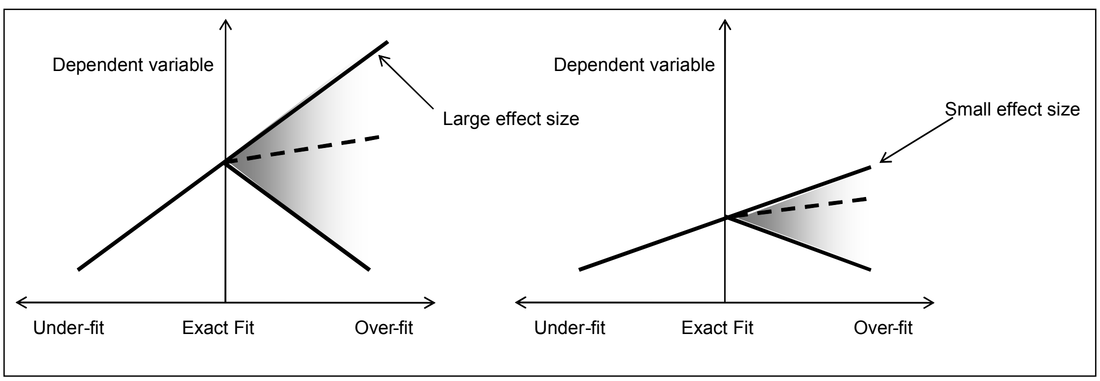

Figure 6. Potential for error in cases where a fit is wrongly assumed to be a symmetric variable, for large effect size (left graph) and small effect size (right graph).

CONCLUSIONS

Compared to symmetric approaches that only consider under-fit effects, the consideration of both under-fit and over-fit in a research model requires additional effort, associated for example with the inclusion of additional survey questions or the introduction of dummy variables to calculate fit. Expected benefits come in the form of improved empirical results (t-values, R^2), thus, possibly stronger support for the suggested hypotheses. The implications are more precise associations between technology offerings and organizational requirements. In extreme cases, an erroneous assumption of symmetry may in fact confound the reported (under-fit) results. As indicated in Figure 6, the potential for error from wrongly applying a symmetric approach to fit is highest in the case of large effect sizes.

In addition, valuable insights for theory and practice can be obtained from the analysis of over-fit situations as such. The analysis could help answer questions about the value of adding features and functions to information technology and devices. For some systems, adding features beyond a situation of exact fit, and thus effectively creating a situation of over-fit, may not require a large additional investment, but could contribute to a sizeable increase in user performance or satisfaction. In other cases, decision makers may benefit from a more precise idea about the negative effects of over-fit, and the need to avoid both situations of under-fit and over-fit.

Based on our analysis, we recommend the application of an asymmetric approach to fit as the default research design. Symmetric approaches with a sole focus on under-fit should only be applied after careful consideration, given the potentially negative implications of an erroneous omission of over-fit.

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REFERENCES

1. Bhattacherjee, A. (2001a) Understanding information systems continuance: An expectation-confirmation model, *MIS Quarterly*, 25, 3, 351.
2. Bhattacherjee, A. (2001b) An empirical analysis of the antecedents of electronic commerce service continuance, *Decision Support Systems*, 32, 201.
3. D'Ambra, J. and Rice, R. E. (2001) Emerging factors in user evaluation of the World Wide Web, *Information and Management*, 38, 6, 373-384.
4. Dishaw, M. T. and Strong, D. M. (1999) Extending the technology acceptance model with task-technology fit constructs, *Information & Management*, 36, 1, 9-21.
5. Dishaw, M. T. and Strong, D. M. (1998) Supporting software maintenance with software engineering tools: A computed task-technology fit analysis, *Journal of Systems and Software*, 44, 2, 107-120.
6. Gebauer. J. and Tang, Y. (2007). User requirements of mobile technology – Results from a survey of mobile professionals, in *Proceedings of the Workshop on E-Business*.
7. Goodhue, D. (1997) The model underlying the measurement of the impacts of the IIC on the end-users, *Journal of the American Society for Information Science*, 48, 5, 449-453.
8. Goodhue, D. L. (1998) Development and measurement validity of a task-technology fit instrument for user evaluations of information systems, *Decision Sciences*, 29, 1, 105-138.
9. Goodhue, D. L., Klein, B. D. and March, S. T. (2000) User evaluations of IS as surrogates for objective performance, *Information & Management*, 38, 2, 87-101.
10. Goodhue, D.L. and Thompson (1995) Task-technology fit and individual performance, *MIS Quarterly*, 3, 213-236.
11. Hunter, J. E. and Schmidt, F. L. (2004) *Methods of meta-analysis: Correcting error and bias in research findings*, second edition, Sage Publication, Thousand Oaks.
12. Iivari, J. (1992) The organizational fit of information systems, *Journal of Information Systems*, 2, 1, 3-29.
13. Junglas, I. A. and Watson, R. T. (2003) U-commerce: An experimental investigation of ubiquity and uniqueness, in *Proceedings of the International Conference on Information Systems*, 414-426
14. Lawrence, P. R. and Lorsch, J. W. (1967) *Organization and environment*, Harvard University Press, Cambridge, MA.
15. Lee, C. C, Cheng, H. K. and Cheng, H. H (2007) An empirical study of mobile commerce in insurance industry: Task-technology fit and individual differences, *Decision Support Systems*, 43, 95-110.
16. Lim, K. H., O'Connor, M. J. and Remus, W. E. (2005) The impact of presentation media on decision making: Does multimedia improve the effectiveness of feedback? *Information & Management*, 42, 2, 305-316.
17. Lipsey, M. W. and Wilson, D. B. (2000) *Practical meta-analysis*, Sage Publications, Thousand Oaks.
18. Mathieson, K. and Keil, M. (1998) Beyond the interface: Ease of use and task/technology fit, *Information & Management*, 34, 4, 221-230.
19. Naman, J. L. and Slevin, D. P. (1993). Entrepreneurship and the concept of fit: A model and empirical tests, *Strategic Management Journal*, 14, 137-153.

20. Oliver, R. L. (1977) Effect of expectation and disconfirmation on postexposure product evaluations – An alternative interpretation, *Journal of Applied Psychology*, 62,4, 480.
21. Shirani, A. I., Tafti, M. H. A. and Affisco, J. F. (1999) Task and technology fit: A comparison of two technologies for synchronous and asynchronous group communication, *Information & Management*, 36, 3, 139-150.
22. Susarla, A., Barua, A. and Whinston, A. B. (2003) Understanding the service component of application service provision: An empirical analysis of satisfaction with ASP services, *MIS Quarterly*, 27, 1, 91.
23. Van de Ven, A. H. and Drazin, R. (1985) The concept of fit in contingency theory, *Research in Organizational Behavior*, 7, 333-365.
24. Venkatraman, N. (1989) The concept of fit in strategy research: Toward verbal and statistical correspondence, *Academy of Management Review*, 14, 3, 423-444.
25. Zajac, E. J., Kraatz, M. S. and Bresser, B. K. (2000) Modeling the dynamics of strategic fit: A normative approach to strategic change, *Strategic Management Journal*, 21, 429-453.
26. Zigurs, I. and Buckland, B. K. (1998) A theory of task-technology fit and group support system effectiveness, *MIS Quarterly*, 22, 3, 313-334.
27. Zigurs, I., Buckland, B., Connolly, J., and Wilson, E. V. (1999) A test of task-technology fit theory for group support systems, *Data Base for Advances in Information Systems*, 30, 3/4, 34-50.