Chapter IV
Data Analysis

This chapter provides the analysis of the quantitative data. Case background will be firstly provided. A brief summary of the data analysis approach is described, including the statistical techniques employed. Next, the reliability and validity analysis of the survey instruments are presented. The results of the statistical analysis are discussed next. Finally, the case background is given with the summary of the findings. The set of acronyms used for the rest of this chapter is listed in Table 13.

Table 13 Acronyms of constructs

Construct Group	Acronym	Construct
User Acceptance	PU	Perceived Usefulness
	PEU	Perceived Ease of Use
	SN	Subjective Norm
	ATUC	Cognitive Attitude towards Usage
	ATUA	Affective Attitude towards Usage
	ATU	Attitude towards Usage
	IU	Intention to Use
	SA	Symbolic Adoption
User Resistance	PP	Perceived Level of Power
	PI	Perceived Inequity
	PSE	Perceived Self-efficacy
	RTAC	Cognitive Resistance Attitude
	RTAA	Affective Resistance Attitude
	RTA	Resistance Attitude
	RTB	Resistance Behaviors
Job-related Outcomes	JS	Job Satisfaction

4.1 Case background

Qualitative data were derived mainly from the interview sessions, with the additional information from news and documents. Data were summarized to illustrate the background of the case study. This will help to clarify the discussion of the results.

4.1.1 POSTAL Case Background Summary: A selection/definition phase

POSTAL is a large state-owned enterprise with the mission to provide postal and monetary services to the entire country. It was corporatized from another state-owned enterprise according to the policy of public reform. But before that, the first postal service in Thailand was introduced in 1883. With over a century of operation, the number of employees working for POSTAL was over 20,000. The services continued to serve the nationwide satisfactorily until the advancement of technology posed threats to the traditional services. The impact of technological change was clearly visible to POSTAL. People were offered with various choices of communication methods. They started to rely more on more advanced communication technologies such as e-mail rather than the conventional postal services. Notwithstanding the decline rate of customers, POSTAL strengthened the efficiency and reliability of services, as well as introduced new services for business and individual customers. Yummy Post was one of the examples. It is the service delivering Thai delicacies to any house in Bangkok, from all over Thailand. The reputation of POSTAL seemed to be better. It appeared that organizational change was not new to POSTAL, as it had been through radical transformation. This change was widely considered to be successful by others.

In the year 2008, there was an initiative to replace the old system with a new ERP package. The first attempt of the procurement was officially announced to the public in order to find a company to implement the new system. Unfortunately, the procurement was cancelled and postponed. Later, there were two consecutive attempts to procure the new ERP implementation, but both of the attempts were cancelled and postponed again. Finally, the fourth attempt was announced in May 2010. The data were collected shortly after the procurement was officially announced to the public. In spite of lacking direct experience with the new implementation, they were aware of the forthcoming project. The old system being used was seen as providing benefits to the organization.

4.1.2 ENERGY Case Summary: An implementation phase

The history of ENERGY, the other state-owned enterprise that served as a case in this study, began in the 1880s. With a long history of operation, organizational culture would present an obstacle to any change initiative. Change was also not new to this organization. In the year 1998 during the reign of Thaksin, there was an attempt at privatization. However, the idea of privatization was met with strong resistance from all quarters, particularly from labor unions. Strong resistance was demonstrated implicitly and explicitly. Despite the strong criticism against this change, the plan continued. After the exiled Prime Minister Thaksin was overthrown, the plan ceased. The consequential outcomes of privatization still yielded some benefits to ENERGY. An IT master plan was developed during the time of the privatization plan being executed. One of the IT initiatives was to implement an ERP project that could integrate all chains of commands in ENERGY as one unified system. In the year 2007, the ERP project began with the aim to integrate and streamline the working processes of all key functions. This was a big challenge to ENERGY since the organizational culture seemed to be a main barrier to the implementation. ENERGY had been operating in a form of a silo organization. There was no mutual standard of practice. Having operated under different principles for a long period of time, every business unit seemed to have different ideas in devising the new system. During the requirement definition phase, business blueprints were required to be developed as a new design of the integrated business process according to ASAP methodology. One of the milestones of this implementation project was business blueprints, for which users were to approve the design. When the due date of this milestone was approaching, there were disagreements from users with the new design. Users declined to sign off on the blueprint, causing a major delay of the entire project. A lot of effort was made to reconcile the disagreements. Although time limitation was enforced on users in dealing with the issues regarding the blueprint sign off, this enforcement yielded controversial results. The progress of the project that seemed to be on hold for a certain period was pushed forward and the momentum of the project seemed to be recovered. Some groups of users agreed with this forceful approach, but others did not.

4.1.3 WATER Case Summary: An operation phase

WATER, the state-owned enterprise founded in 1909, had the mission to provide good quality water supply to residences, businesses, and industries in Bangkok and the perimeter. Unlike the other two cases, no radical change was evidently identified close to the period of ERP implementation. The implementation of ERP had been completely finished for almost 10 years. The ERP was implemented within the original timeframe. Since the scope of the implementation was limited to only financial modules, it was viewed to be the reason that the implementation was finished on-time.

Only a few modules in accounting and finance were chosen to be implemented although ERP had been in use for a long period. Although there was a plan to upgrade the system to a new version, there still was no official plan to replace their older version of ERP. Users were familiar with the system, and the system usage became routine in this organization. Since it had been in operation quite long, the experiences from the implementation appeared not to affect the current usage although a few informants could remember what had happened during the implementation. Users acknowledged the benefits of using ERP. However, they thought that other modules should be implemented to cover more parts of business operations.

4.2 An approach to data analysis

The use of Structural Equation Modeling (SEM) has become more popular, since it incorporates several different statistical techniques including confirmatory factor analysis (CFA), path analysis, multiple regression analysis, and analysis of variance (ANOVA) (Bollen, 1995). The benefits of SEM overcome some limitations posed by traditional techniques. SEM can effectively deal with reciprocal relationships between constructs. Moreover, it allows a valid analysis of a model with latent variables. There are certain types of parameter estimation techniques used in SEM software: a covariance-based and component-based analysis (Chin, 1998a). In his comments on the use of SEM, Chin (1998a) suggests that a relatively large sample size should be considered in order for a model to provide sufficient statistical validity for a covariance-based approach to SEM as adopted in SEM software such as EQS and LISREL. Mainly, normal distributions of variables and the use of interval scale measures are assumptions that many of these approaches require.

Partial Least Squares (PLS) is a component approach to SEM distinct from the traditional factor-based covariance approaches (Chin, 1998a). It is seen to be a soft-modeling approach since few distribution assumptions are required (Tenenhaus et al., 2005). The use of PLS for estimating parameters in SEM is becoming more popular in IS research, as evidenced by the growing number of published articles in top-tier journals that employ the framework of TAM (e.g.,Gefen and Straub, 1997; Saadé and Bahli, 2005; Venkatesh and Morris, 2000; Venkatesh et al., 2003; Wixom and Todd, 2005). The reason underlying the growing popularity of SEM techniques is probably owing to the fact that this analytical approach is more useful when data size is comparatively small and multivariate normal distribution assumption is not achieved. In comparison to a covariance-based approach, assumptions in a PLS approach tend to be less restrictive (Henseler, Ringle, and Sinkovics, 2009; Tenenhaus et al., 2005).

Previous studies have informatively explained the details regarding the algorithm of PLS path models (Chin, 1998b; Henseler et al., 2009; Tenenhaus et al., 2005). In brief, path models are formally identified by the inner and outer models which are often referred to as structural and measurement models. In an inner model, there are theorized pathways and relationships between unobserved or latent constructs. The relationships between a construct and the observed items are defined in a measurement model. After the PLS path models are defined, latent variable scores are estimated by an iterative procedure. At this stage, inner and outer weights are estimated in order to determine latent variable scores. The iteration process is terminated when the change in outer weights is less than the predefined threshold. Finally, loadings and inner regression coefficients are determined using a linear regression.

With all the benefits discussed above, it can be posited that PLS is a justified alternative choice for empirical research in IS. Theoretical models underpinning the theoretical framework proposed in this research comprise both structural and measurement models. Even though TAM can be seen to be a well-tested robust model, user resistance still lacks robust empirical validation and can be seen to be in the exploratory stage. Hence, in this study, a PLS approach to SEM was chosen for some justifiable reasons. smartPLS (Ringle, Wende, and Will, 2005) was used for this data analysis task. First, the sample size of this study is not relatively large. Second, some measures are not normally distributed. Third, this study aims to assess how effectively the proposed theories can predict and explain symbolic adoption and resistance to change, as well as job-related outcomes.

The steps in using PLS estimation for testing empirical data in the present study followed what is suggested by Henseler, et al. (2009). The measurement models were assessed for their reliability. Next, hypothesized relationships among theoretical constructs were tested. Data acquired from the three cases were used for model testing. To provide an exhaustive view of theory testing, theoretical models drawn from previous studies were empirically examined. These included TAM, Resistance to Change, and the proposed framework.

4.3 Reliability and Validity of Survey Instruments

Although there are no goodness-of-fit indices provided in a PLS approach to SEM, two primary criteria to assess the models have been recommended by Chin (1998b). The measurement reliability and validity should satisfy the cut-off criteria. The path models in this study were reflective measurement models, as all latent variables were measured by a combination of observed variables rather than the collective set of variables (Henseler et al., 2009). In this section, three sets of composite reliability and AVE (Average Variance Extracted) were obtained from three sets of data acquired from different cases in order to test the reliability and validity separately (for the detailed calculation of composite reliability and AVE, please see Henseler et al. (2009).

Composite reliability was primarily used to determine the degree of reliability of survey instruments adopted in this research instead of Cronbach's alpha, as the alpha was seen to underestimate the internal consistency reliability of latent variables in PLS path models. This follows what is suggested in the work of Henseler, et al. (2009) that summarizes previous studies related to PLS. The authors also recommend the criteria for assessing reflective measurement models. Composite reliability should not be lower than 0.6. When the composite reliability is low, an item can be excluded only if the exclusion substantially improves composite reliability.

Table 14 to Table 16 present composite reliability and AVE and Cronbach's alpha used to assess the reliability and validity of scales in path models from the three cases. All constructs from TAM passed the criterion suggested. However, some constructs from user resistance and job-related outcomes appear to have insufficient degree of reliability and validity in some cases.

For PI, the value of composite reliability was below 0.60 and the value of AVE was less than 0.50, in the case of POSTAL and WATER. PSE did not satisfy the cut-off criteria in the case of POSTAL and ENERGY. Furthermore, to provide a higher degree of reliability assessment, outer loadings of each item were reported in Table 17. It was recommended that the value of loadings should be greater than 0.70 (Henseler et al., 2009).

Table 14 Summary of Composite Reliability and AVE: POSTAL

Construct Group	Acronym	Composite Reliability	AVE	Cronbach's Alpha
User Acceptance	PU	0.940	0.722	0.881
	PEU	0.914	0.641	0.841
	SN	0.972	0.946	0.925
	ATUC	0.958	0.920	0.911
	ATUA	0.941	0.888	0.874
	ATU	0.954	0.839	0.936
	IU	0.940	0.838	0.932
	SA	0.878	0.707	0.791
User Resistance	PP	0.904	0.759	0.833
	PI	0.096	0.330	0.119
	PSE	0.255	0.199	0.798
	RTAC	0.907	0.765	0.841
	RTAA	0.968	0.884	0.956
	RTA	0.959	0.769	0.948
	RTB	0.716	0.509	0.703
Job-related Outcomes	JS	0.954	0.518	0.947

Table 15 Summary of Composite Reliability and AVE: ENERGY

Construct Group	Acronym	Composite Reliability	AVE	Cronbach's Alpha
User Acceptance	PU	0.939	0.718	0.920
	PEU	0.927	0.678	0.893
	SN	0.961	0.925	0.894
	ATUC	0.970	0.942	0.909
	ATUA	0.968	0.938	0.896
	ATU	0.968	0.885	0.957
	IU	0.955	0.875	0.914
	SA	0.946	0.853	0.854
User Resistance	PP	0.926	0.806	0.840
	PI	0.833	0.503	0.455
	PSE	0.690	0.384	0.737
	RTAC	0.908	0.767	0.794
	RTAA	0.952	0.832	0.917
	RTA	0.946	0.717	0.933
	RTB	0.820	0.491	0.669
Job-related Outcomes	JS	0.982	0.735	0.945

Table 16 Summary of Composite Reliability and AVE: WATER

Construct Group	Acronym	Composite Reliability	AVE	Cronbach's Alpha
User Acceptance	PU	0.951	0.765	0.935
	PEU	0.947	0.747	0.904
	SN	0.978	0.957	0.945
	ATUC	0.967	0.935	0.912
	ATUA	0.969	0.941	0.920
	ATU	0.972	0.895	0.950
	IU	0.964	0.900	0.932
	SA	0.933	0.822	0.858
User Resistance	PP	0.951	0.867	0.885
	PI	0.227	0.449	0.777
	PSE	0.899	0.748	0.821
	RTAC	0.960	0.856	0.788
	RTAA	0.942	0.702	0.937
	RTA	0.786	0.435	0.922
	RTB	0.933	0.775	0.728
Job-related Outcomes	JS	0.966	0.593	0.948

Table 17 Outer loadings of each item

Constructs	Items	Loadings		
		POSTAL	ENERGY	WATER
PU	PU1	0.847	0.830	0.867
	PU2	0.795	0.888	0.903
	PU3	0.839	0.874	0.911
	PU4	0.877	0.805	0.934
	PU5	0.860	0.839	0.878
	PU6	0.875	0.847	0.741
PEU	PEU1	0.830	0.812	0.843
	PEU2	0.875	0.840	0.848
	PEU3	0.850	0.839	0.897
	PEU4	0.764	0.800	0.910
	PEU5	0.669	0.841	0.850
	PEU6	0.798	0.809	0.836
SN	SN1	0.974	0.962	0.979
	SN2	0.971	0.962	0.978
ATUC	ATUC1	0.959	0.970	0.967
	ATUC2	0.959	0.971	0.967
ATUA	ATUA1	0.942	0.969	0.971
	ATUA2	0.943	0.968	0.969
ATU	ATUC1	0.918	0.930	0.949
	ATUC2	0.929	0.953	0.940
	ATUA1	0.904	0.944	0.959
	ATUA2	0.913	0.936	0.936
IU	IU1	0.899	0.934	0.932
	IU2	0.948	0.943	0.962
	IU3	0.900	0.930	0.952

Constructs	Items	Loadings		
		POSTAL	ENERGY	WATER
SA	SA1	0.875	0.941	0.922
	SA2	0.879	0.928	0.922
	SA3	0.764	0.902	0.875
PP	PP1	0.899	0.887	0.935
	PP2	0.934	0.915	0.945
	PP3	0.773	0.891	0.913
PI	PI1	0.627	0.723	-0.749
	PI2	0.674	0.871	-0.686
	PI3	-0.563	0.624	0.544
	PI4	0.417	0.698	-0.518
	PI5	-0.557	0.599	0.652
PSE	PSE1	0.761	0.619	0.876
	PSE2	0.396	0.629	0.898
	PSE3	0.104	0.260	0.855
	PSE4	-0.216	0.832	0.893
RTAC	RTAC1	0.778	0.855	0.825
	RTAC2	0.925	0.916	0.920
	RTAC3	0.913	0.855	0.847
RTAA	RTAA1	0.936	0.901	0.911
	RTAA2	0.940	0.932	0.946
	RTAA3	0.945	0.945	0.907
	RTAA4	0.939	0.868	0.937
RTA	RTAC1	0.778	0.867	0.632
	RTAC2	0.925	0.903	0.866
	RTAC3	0.913	0.904	0.781
	RTAA1	0.936	0.832	0.880

Constructs	Items	Loadings		
		POSTAL	ENERGY	WATER
	RTAA2	0.940	0.733	0.922
	RTAA3	0.945	0.847	0.857
	RTAA4	0.939	0.830	0.893
RTB	RTB1	0.636	0.447	0.382
	RTB2	0.637	0.827	0.800
	RTB3	0.645	0.801	0.680
	RTB4	0.578	0.816	0.680
	RTB5	-0.750	0.512	0.681
JS	JS1	0.394	0.671	0.619
	JS2	0.501	0.743	0.419
	JS3	0.720	0.839	0.736
	JS4	0.790	0.861	0.725
	JS5	0.583	0.837	0.736
	JS6	0.683	0.826	0.638
	JS7	0.552	0.839	0.817
	JS8	0.612	0.866	0.752
	JS9	0.785	0.881	0.844
	JS10	0.811	0.880	0.827
	JS11	0.842	0.902	0.818
	JS12	0.373	0.870	0.818
	JS13	0.714	0.900	0.826
	JS14	0.800	0.888	0.748
	JS15	0.689	0.875	0.731
	JS16	0.789	0.886	0.726
	JS17	0.845	0.878	0.905
	JS18	0.858	0.881	0.858

Constructs	Items	Loadings		
		POSTAL	ENERGY	WATER
	JS19	0.871	0.889	0.815
	JS20	0.863	0.895	0.898

As is evident from Tables 14 to 17, overall, the PI, PSE, and RTB did not satisfy the criteria of the reliability and validity of measurement models. Items with low loadings were dropped from the measurement models used in the three cases in order for the models to be applicable for comparison. These included PI3, PI4, PI5 from PI, PSE3, and PSE4 from PSE, and RTB5 from RTB as shown in Table 18.

Table 18 Decisions on dropping items

Construct	Items	English Questions	Thai Questions	Decision
PI	PI1	I invest more in my work than I get out of it.	ฉันลงทุนในงานของฉันมากกว่าที่ฉันได้จากงาน	Kept
	PI2	I exert myself too much considering what I get back in return.	ฉันทุ่มเทตัวเองมากเกินไป พิจารณากับสิ่งที่ฉันได้ตอบแทนกลับมา	Kept
	PI3	For the efforts I put into the organization, I get much in return. (reversed)	สำหรับความพยายามที่ฉันได้ทุมเทไปกับองค์กรนี้ ฉันได้ผลตอบแทนกลับมามาก	Dropped
	PI4	If I take into account my dedication, the organization ought to give me a better practical training.	ถ้าฉันนำความทุ่มเทมาพิจารณา องค์กรนี้ควรที่จะให้การฝึกอบรมที่ดีกว่านี้	Dropped

Construct	Items	English Questions	Thai Questions	Decision
	PI5	In general, the benefits I receive from the organization outweigh the effort I put in it (reversed).	โดยทั่วไป ผลตอบแทนที่ฉันได้รับจากองค์กรนี้มีน้ำหนักมากกว่าสิ่งที่ฉันทุ่มเทลงไป	Dropped
PSE	PSE1	I could complete a job or task using ERP if there is no one around to tell me what to do as I go.	ฉันสามารถทำงานหรือภารกิจให้สำเร็จโดยใช้ ERP ถึงแม้ว่าไม่มีใครอยู่ใกล้ที่จะบอกฉันว่าฉันจะต้องทำอะไร	Kept
	PSE2	I could complete a job or task using ERP if I could call someone for help if I get stuck.	ฉันสามารถทำงานหรือภารกิจให้สำเร็จโดยใช้ ERP ถ้าฉันสามารถเรียกถามคนอื่นถ้าฉันใช้งานติดขัด	Kept
	PSE3	I could complete a job or task using ERP if I have a lot of time to complete the job for which ERP is provided.	ฉันสามารถทำงานหรือภารกิจให้สำเร็จโดยใช้ ERP ถ้าฉันมีเวลามากมายเพื่อทำงานที่จะต้องทำให้สำเร็จใน ERP	Dropped
	PSE4	I could complete a job or task using ERP if I have just the built-in help facility for assistance.	ฉันสามารถทำงานหรือภารกิจให้สำเร็จโดยใช้ ERP ถ้าฉันมีสิ่งอำนวยความสะดวกช่วยเหลือติดตั้งไว้สำหรับการสนับสนุน	Dropped
RTB	RTB1	I look for ways to prevent ERP implementation.	ฉันมองหาหนทางที่จะป้องกันการพัฒนาระบบ ERP	Kept
	RTB2	I protest against ERP implementation.	ฉันต่อต้านการพัฒนาระบบ ERP	Kept

Construct	Items	English Questions	Thai Questions	Decision
	RTB3	I complain about ERP implementation to my colleagues.	ฉันบ่นเกี่ยวกับการพัฒนาระบบ ERP กับเพื่อนร่วมงานของฉัน	Kept
	RTB4	I present my objections regarding ERP implementation to management.	ฉันเสนอความคิดคัดค้านเกี่ยวกับการพัฒนาระบบ ERP	Kept
	RTB5	I speak rather highly of ERP implementation to others.	ฉันพูดเกี่ยวกับการพัฒนาระบบ ERP ในด้านดีกับผู้อื่น	Dropped

After the exclusion of the items (details provided in Table 18), the models show improvement in the composite reliability and AVE, as shown in the Table 19. It may appear that the exclusion of the items would decrease the content validity. As these items were developed from other settings, they may not be applicable when used with this particular setting. The three organizations chosen for this study were state-owned enterprises providing infrastructure services. Members of this type of organization exhibited a particular type of behavior. In conclusion, all measurement models were considered to have satisfied the reliability.

Table 19 Summary of Composite Reliability and AVE: WATER

Constructs	CASE	Composite Reliability		AVE	
		Before Exclusion	After Exclusion	Before Exclusion	After Exclusion
PI	POSTAL	0.096	0.886	0.330	0.795
	ENERGY	0.833	0.888	0.503	0.754
	WATER	0.227	0.938	0.449	0.883
PSE	POSTAL	0.255	0.852	0.199	0.744
	ENERGY	0.690	0.819	0.384	0.700
	WATER	0.933	0.910	0.776	0.836
RTB	POSTAL	0.716	0.890	0.509	0.671
	ENERGY	0.820	0.853	0.491	0.598
	WATER	0.786	0.881	0.435	0.654

Henseler et al. (2009) further recommend the assessment of validity. Convergent validity was assessed using Average Variance Extracted (AVE). A value of AVE should be higher than 0.5 for adequate convergent validity. Discriminant validity can be assessed by Fornell-Larcker criterion and cross-loadings. It was suggested that the AVE of each latent variable should be greater than the highest square of the latent variable to any other latent variable. As for the cross-loadings, an observed item should correlate higher with its latent variable than with others.

Table 20 to 22 present latent variable correlations and AVE on the diagonal. All constructs appear to have sufficient convergent validity since AVEs are greater than 0.50. Table 23 to 25 show cross-loadings. Most items are correlated highest with their particular latent variable. There are only two items that seem to be a problem. However, the highest cross-loadings of the problematic items to other latent variable were not much different from their loadings with their own latent variable. Therefore, it can be concluded that all constructs have adequate discriminant validity. In summary, all constructs satisfy the validity assessment.

Table 20 Latent variable correlations with AVE on the diagonal: POSTAL

	PU	PEU	SN	ATU	IU	SA	PSE	PP	PI	RTA	RTB	JS
PU	0.722											
PEU	0.844	0.641										
SN	0.714	0.737	0.946									
ATU	0.659	0.639	0.556	0.839								
IU	0.442	0.470	0.373	0.659	0.838							
SA	0.613	0.620	0.565	0.792	0.649	0.707						
PSE	0.472	0.417	0.381	0.639	0.548	0.584	0.744					
PP	0.046	0.186	0.201	0.194	0.217	0.201	0.269	0.759				
PI	0.086	0.091	0.014	0.153	0.054	0.159	0.137	0.496	0.795			
RTA	-0.094	0.081	0.140	-0.107	-0.161	0.022	-0.105	0.415	0.304	0.769		
RTB	-0.137	-0.012	0.029	-0.063	0.071	-0.008	0.115	0.361	0.276	0.494	0.671	
JS	0.453	0.486	0.568	0.702	0.577	0.756	0.650	0.306	0.216	0.170	0.208	0.518

Table 21 Latent variable correlations with AVE on the diagonal: ENERGY

	PU	PEU	SN	ATU	IU	SA	PSE	PP	PI	RTA	RTB	JS
PU	0.718											
PEU	0.732	0.678										
SN	0.523	0.578	0.925									
ATU	0.451	0.347	0.302	0.885								
IU	0.491	0.448	0.350	0.581	0.875							
SA	0.384	0.316	0.274	0.776	0.553	0.853						
PSE	0.370	0.422	0.262	0.406	0.504	0.369	0.700					
PP	0.249	0.260	0.184	0.283	0.231	0.303	0.252	0.806				
PI	0.131	0.141	0.163	0.282	0.187	0.327	0.224	0.361	0.754			
RTA	-0.142	-0.145	0.004	0.018	-0.175	0.122	-0.024	0.231	0.259	0.717		
RTB	-0.047	-0.032	0.026	-0.062	-0.015	-0.021	0.038	0.291	0.128	0.562	0.598	
JS	0.321	0.273	0.268	0.499	0.330	0.586	0.289	0.347	0.304	0.253	0.115	0.735

Table 22 Latent variable correlations with AVE on the diagonal: WATER

	PU	PEU	SN	ATU	IU	SA	PSE	PP	PI	RTA	RTB	JS
PU	0.765											
PEU	0.787	0.747										
SN	0.605	0.637	0.957									
ATU	0.435	0.340	0.211	0.895								
IU	0.496	0.501	0.414	0.522	0.900							
SA	0.442	0.437	0.281	0.805	0.452	0.822						
PSE	0.315	0.402	0.340	0.104	0.137	0.224	0.867					
PP	0.354	0.405	0.340	0.279	0.257	0.319	0.657	0.883				
PI	0.399	0.405	0.336	0.340	0.357	0.336	0.340	0.307	0.836			
RTA	-0.159	-0.164	-0.096	0.028	-0.188	0.148	0.298	0.186	-0.118	0.702		
RTB	0.046	0.037	-0.015	-0.079	0.157	-0.043	0.305	0.230	-0.156	0.495	0.654	
JS	0.551	0.482	0.450	0.618	0.535	0.629	0.289	0.382	0.522	0.079	0.132	0.593

Table 23 Cross-loadings: POSTAL

	PU	PEU	SN	UA	IU	SA	PSE	Power	Inequity	RC	RTC	JS
PU1	0.847	0.686	0.470	0.603	0.319	0.468	0.325	0.083	0.155	-0.124	-0.068	0.323
PU2	0.795	0.627	0.467	0.391	0.250	0.314	0.250	-0.023	0.045	-0.158	-0.169	0.164
PU3	0.840	0.713	0.702	0.505	0.400	0.515	0.408	0.014	0.014	-0.069	-0.136	0.440
PU4	0.877	0.750	0.587	0.555	0.372	0.528	0.432	0.005	0.065	-0.112	-0.112	0.360
PU5	0.860	0.742	0.687	0.636	0.462	0.622	0.481	0.046	0.069	-0.083	-0.130	0.539
PU6	0.875	0.766	0.683	0.624	0.408	0.609	0.461	0.090	0.087	0.035	-0.099	0.410
PEU1	0.743	0.830	0.588	0.549	0.456	0.494	0.417	0.198	0.054	-0.006	-0.057	0.425
PEU2	0.780	0.875	0.654	0.559	0.383	0.539	0.301	0.119	0.033	0.024	-0.065	0.397
PEU3	0.693	0.850	0.621	0.537	0.472	0.575	0.345	0.143	0.088	0.028	-0.062	0.460
PEU4	0.603	0.764	0.560	0.455	0.335	0.383	0.237	0.084	0.013	0.061	0.020	0.282
PEU5	0.564	0.669	0.523	0.375	0.147	0.374	0.236	0.139	0.175	0.328	0.166	0.291
PEU6	0.643	0.798	0.587	0.567	0.414	0.583	0.445	0.206	0.094	0.020	-0.006	0.453
SN1	0.710	0.749	0.974	0.556	0.368	0.562	0.387	0.187	0.008	0.113	0.021	0.552
SN2	0.679	0.684	0.971	0.525	0.356	0.537	0.353	0.206	0.020	0.159	0.036	0.552
ATUA1	0.585	0.580	0.486	0.904	0.648	0.755	0.615	0.171	0.123	-0.164	-0.111	0.598
ATUA2	0.697	0.688	0.583	0.912	0.608	0.741	0.586	0.167	0.133	-0.021	-0.018	0.715
ATUC1	0.607	0.555	0.471	0.919	0.606	0.689	0.531	0.138	0.114	-0.178	-0.079	0.568
ATUC2	0.522	0.514	0.494	0.929	0.552	0.717	0.610	0.236	0.192	-0.032	-0.025	0.689
IU1	0.419	0.462	0.368	0.537	0.901	0.542	0.485	0.161	-0.005	-0.157	0.091	0.518
IU2	0.431	0.443	0.397	0.654	0.947	0.635	0.559	0.237	0.053	-0.104	0.078	0.581
IU3	0.364	0.389	0.259	0.612	0.899	0.601	0.459	0.192	0.094	-0.186	0.028	0.485
SA1	0.560	0.555	0.489	0.658	0.523	0.880	0.491	0.181	0.136	0.116	-0.032	0.593
SA2	0.437	0.480	0.455	0.682	0.573	0.884	0.420	0.268	0.185	0.055	-0.010	0.659
SA3	0.550	0.528	0.481	0.656	0.538	0.755	0.563	0.055	0.077	-0.114	0.021	0.650
PSE1	0.411	0.376	0.302	0.540	0.468	0.488	0.929	0.260	0.127	-0.108	0.095	0.566
PSE2	0.419	0.350	0.388	0.594	0.501	0.553	0.791	0.197	0.108	-0.066	0.111	0.578
PP1	-0.064	0.030	0.059	0.042	0.115	0.072	0.142	0.899	0.407	0.390	0.311	0.170
PP2	0.063	0.222	0.225	0.167	0.192	0.182	0.249	0.934	0.455	0.415	0.348	0.269
PP3	0.168	0.278	0.286	0.382	0.311	0.336	0.371	0.773	0.458	0.248	0.283	0.429
PI1	0.120	0.111	-0.028	0.170	0.075	0.095	0.149	0.419	0.860	0.229	0.188	0.168
PI2	0.045	0.059	0.044	0.113	0.028	0.178	0.103	0.463	0.923	0.304	0.292	0.213
RTAA1	-0.058	0.118	0.177	0.020	-0.083	0.065	-0.091	0.419	0.295	0.928	0.438	0.168
RTAA2	-0.096	0.072	0.159	-0.116	-0.194	0.021	-0.096	0.392	0.300	0.935	0.469	0.147
RTAA3	-0.083	0.050	0.125	-0.098	-0.099	0.035	-0.084	0.352	0.286	0.901	0.388	0.182
RTAA4	-0.045	0.082	0.118	-0.065	-0.080	0.057	-0.122	0.330	0.214	0.900	0.415	0.177
RTAC1	-0.017	0.125	0.103	-0.056	-0.134	0.062	0.005	0.256	0.198	0.694	0.395	0.115
RTAC2	-0.100	0.065	0.093	-0.126	-0.164	-0.034	-0.112	0.350	0.236	0.899	0.497	0.136
RTAC3	-0.163	-0.007	0.077	-0.213	-0.232	-0.059	-0.128	0.427	0.324	0.859	0.429	0.116
RTB1	0.064	0.178	0.113	0.118	0.339	0.119	0.286	0.447	0.151	0.263	0.719	0.240
RTB2	-0.191	-0.108	-0.026	-0.150	-0.054	-0.118	0.010	0.317	0.226	0.484	0.896	0.133
RTB3	-0.092	-0.065	0.065	-0.015	0.009	0.047	0.126	0.216	0.318	0.389	0.781	0.224
RTB4	-0.176	0.015	-0.025	-0.105	0.027	-0.028	0.021	0.251	0.200	0.449	0.871	0.116
JS1	0.162	0.217	0.192	0.240	0.187	0.284	0.118	0.196	0.455	0.294	0.217	0.401
JS2	0.183	0.235	0.289	0.240	0.171	0.280	0.270	0.179	0.308	0.293	0.189	0.505
JS3	0.347	0.319	0.554	0.483	0.270	0.519	0.447	0.162	0.101	0.196	0.110	0.721
JS4	0.363	0.395	0.546	0.540	0.431	0.720	0.421	0.282	0.172	0.208	0.165	0.795
JS5	0.147	0.256	0.218	0.292	0.311	0.338	0.300	0.398	0.361	0.356	0.251	0.587
JS6	0.335	0.305	0.247	0.497	0.377	0.565	0.465	0.208	0.258	0.048	0.094	0.684
JS7	0.171	0.257	0.203	0.363	0.312	0.459	0.311	0.251	0.156	0.195	0.133	0.556
JS8	0.140	0.213	0.256	0.350	0.239	0.398	0.370	0.108	0.075	0.147	0.175	0.612
JS9	0.435	0.485	0.530	0.662	0.549	0.632	0.478	0.185	0.100	0.140	0.117	0.785
JS10	0.337	0.391	0.534	0.534	0.391	0.575	0.465	0.193	0.098	0.202	0.128	0.813
JS11	0.340	0.385	0.494	0.502	0.346	0.598	0.556	0.227	0.091	0.113	0.125	0.842
JS12	0.128	0.208	0.208	0.194	0.301	0.228	0.238	0.322	0.158	0.169	0.394	0.380
JS13	0.365	0.346	0.417	0.561	0.589	0.551	0.537	0.147	0.026	-0.046	0.103	0.711
JS14	0.458	0.461	0.539	0.584	0.533	0.672	0.562	0.259	0.234	0.044	0.133	0.799
JS15	0.391	0.394	0.402	0.506	0.521	0.568	0.532	0.255	0.095	0.016	0.084	0.686
JS16	0.380	0.405	0.468	0.539	0.470	0.560	0.564	0.320	0.120	0.063	0.160	0.787
JS17	0.353	0.331	0.429	0.601	0.458	0.560	0.562	0.169	0.117	0.106	0.150	0.840
JS18	0.356	0.361	0.430	0.643	0.477	0.631	0.563	0.257	0.193	0.067	0.139	0.855
JS19	0.448	0.460	0.522	0.668	0.557	0.649	0.640	0.246	0.136	0.101	0.213	0.869
JS20	0.377	0.383	0.400	0.689	0.540	0.687	0.627	0.156	0.152	0.059	0.156	0.861

Table 24 Cross-loadings: ENERGY

	PU	PEU	SN	UA	IU	SA	PSE	Inequity	Power	RC	RTC	JS
PU1	0.831	0.573	0.391	0.392	0.344	0.385	0.297	0.209	0.162	-0.083	-0.026	0.270
PU2	0.888	0.629	0.371	0.449	0.333	0.485	0.329	0.206	0.110	-0.160	-0.043	0.262
PU3	0.874	0.625	0.368	0.432	0.299	0.375	0.300	0.232	0.092	-0.113	-0.060	0.264
PU4	0.805	0.522	0.381	0.372	0.350	0.377	0.263	0.246	0.170	-0.090	-0.030	0.310
PU5	0.839	0.670	0.425	0.520	0.329	0.477	0.332	0.171	0.063	-0.163	-0.045	0.278
PU6	0.847	0.686	0.354	0.482	0.302	0.386	0.355	0.209	0.078	-0.107	-0.034	0.249
PEU1	0.619	0.812	0.254	0.421	0.264	0.340	0.364	0.236	0.117	-0.122	0.000	0.197
PEU2	0.638	0.840	0.316	0.466	0.302	0.375	0.351	0.209	0.099	-0.146	-0.037	0.244
PEU3	0.582	0.839	0.301	0.466	0.256	0.388	0.350	0.212	0.147	-0.170	-0.052	0.257
PEU4	0.561	0.800	0.248	0.480	0.228	0.367	0.299	0.160	0.062	-0.065	-0.037	0.194
PEU5	0.620	0.841	0.284	0.487	0.254	0.374	0.359	0.246	0.099	-0.090	0.013	0.203
PEU6	0.592	0.809	0.307	0.536	0.252	0.373	0.360	0.216	0.173	-0.120	-0.049	0.250
SN1	0.383	0.277	0.930	0.262	0.698	0.542	0.371	0.242	0.245	0.000	-0.066	0.429
SN2	0.443	0.340	0.953	0.301	0.721	0.554	0.387	0.257	0.243	0.018	-0.022	0.454
ATUA1	0.501	0.560	0.301	0.962	0.266	0.340	0.257	0.194	0.157	-0.014	0.025	0.266
ATUA2	0.506	0.551	0.279	0.962	0.260	0.332	0.248	0.159	0.157	0.021	0.025	0.249
ATUC1	0.424	0.330	0.277	0.944	0.730	0.535	0.395	0.268	0.288	0.031	-0.068	0.478
ATUC2	0.445	0.354	0.294	0.936	0.767	0.555	0.374	0.296	0.284	0.017	-0.078	0.515
IU1	0.338	0.277	0.698	0.231	0.941	0.517	0.333	0.293	0.324	0.131	-0.011	0.549
IU2	0.341	0.291	0.701	0.260	0.929	0.502	0.342	0.291	0.277	0.124	0.026	0.515
IU3	0.385	0.306	0.747	0.267	0.900	0.511	0.347	0.257	0.304	0.083	-0.071	0.558
SA1	0.468	0.425	0.555	0.321	0.523	0.933	0.479	0.240	0.179	-0.173	-0.036	0.311
SA2	0.463	0.414	0.543	0.332	0.496	0.940	0.477	0.177	0.151	-0.180	-0.026	0.296
SA3	0.446	0.419	0.532	0.329	0.529	0.933	0.459	0.230	0.194	-0.140	0.017	0.319
PSE1	0.341	0.385	0.352	0.224	0.302	0.449	0.974	0.255	0.193	-0.026	0.057	0.247
PSE2	0.313	0.369	0.413	0.279	0.435	0.475	0.673	0.141	0.232	-0.008	-0.041	0.307
PP1	0.179	0.221	0.201	0.143	0.219	0.194	0.225	0.887	0.345	0.227	0.299	0.297
PP2	0.229	0.214	0.265	0.172	0.274	0.213	0.218	0.915	0.311	0.205	0.251	0.306
PP3	0.272	0.269	0.306	0.183	0.334	0.217	0.237	0.891	0.314	0.187	0.228	0.336
PI1	0.181	0.192	0.269	0.142	0.328	0.251	0.223	0.363	0.827	0.147	0.063	0.261
PI2	0.087	0.096	0.251	0.153	0.282	0.129	0.195	0.312	0.956	0.283	0.145	0.286
RTAA1	-0.094	-0.072	0.060	0.037	0.133	-0.131	-0.019	0.222	0.213	0.868	0.506	0.255
RTAA2	-0.153	-0.148	-0.034	-0.041	0.047	-0.181	-0.050	0.189	0.198	0.903	0.506	0.194
RTAA3	-0.134	-0.144	0.011	-0.036	0.077	-0.208	-0.079	0.186	0.211	0.904	0.478	0.199
RTAA4	-0.110	-0.146	-0.015	0.067	0.068	-0.166	-0.078	0.130	0.177	0.833	0.463	0.150
RTAC1	-0.031	-0.046	0.092	0.033	0.145	-0.068	0.079	0.241	0.239	0.732	0.424	0.229
RTAC2	-0.145	-0.120	-0.044	-0.003	0.124	-0.150	0.029	0.234	0.267	0.846	0.499	0.217
RTAC3	-0.165	-0.178	0.047	-0.027	0.130	-0.126	-0.017	0.171	0.235	0.830	0.448	0.259
RTB1	0.180	0.217	0.167	0.225	0.135	0.300	0.229	0.318	0.105	0.191	0.528	0.215
RTB2	-0.056	-0.025	-0.096	-0.008	-0.084	-0.084	0.040	0.228	0.089	0.496	0.866	0.077
RTB3	-0.127	-0.142	-0.115	0.013	-0.066	-0.034	-0.026	0.146	0.073	0.479	0.820	0.030
RTB4	-0.028	-0.022	-0.034	-0.033	0.032	-0.058	-0.014	0.285	0.144	0.486	0.832	0.113
JS1	0.157	0.124	0.284	0.251	0.336	0.146	0.151	0.176	0.254	0.299	0.162	0.670
JS2	0.182	0.149	0.360	0.157	0.395	0.219	0.271	0.225	0.286	0.233	0.081	0.744
JS3	0.230	0.204	0.460	0.192	0.514	0.286	0.241	0.239	0.295	0.238	0.053	0.839
JS4	0.255	0.251	0.430	0.248	0.512	0.291	0.286	0.359	0.311	0.264	0.129	0.862
JS5	0.268	0.191	0.408	0.208	0.444	0.244	0.230	0.263	0.304	0.248	0.104	0.836
JS6	0.239	0.198	0.434	0.196	0.478	0.288	0.304	0.262	0.262	0.232	0.108	0.825
JS7	0.215	0.192	0.409	0.203	0.446	0.219	0.237	0.288	0.251	0.270	0.123	0.839
JS8	0.241	0.209	0.422	0.167	0.491	0.265	0.208	0.277	0.247	0.248	0.148	0.865
JS9	0.253	0.197	0.447	0.179	0.543	0.309	0.226	0.247	0.283	0.199	0.090	0.881
JS10	0.287	0.239	0.437	0.254	0.529	0.300	0.250	0.322	0.251	0.196	0.085	0.880
JS11	0.300	0.225	0.448	0.226	0.548	0.311	0.230	0.283	0.279	0.199	0.064	0.902
JS12	0.304	0.252	0.503	0.238	0.582	0.340	0.249	0.292	0.240	0.170	0.057	0.871
JS13	0.316	0.280	0.438	0.270	0.538	0.307	0.244	0.341	0.251	0.263	0.126	0.901
JS14	0.338	0.305	0.446	0.312	0.536	0.312	0.265	0.351	0.261	0.220	0.098	0.889
JS15	0.301	0.297	0.407	0.292	0.505	0.269	0.238	0.376	0.236	0.198	0.110	0.875
JS16	0.326	0.299	0.423	0.271	0.535	0.295	0.253	0.322	0.258	0.188	0.080	0.886
JS17	0.322	0.268	0.454	0.208	0.534	0.335	0.299	0.306	0.263	0.197	0.055	0.878
JS18	0.293	0.248	0.422	0.211	0.491	0.265	0.233	0.317	0.210	0.190	0.091	0.880
JS19	0.293	0.229	0.432	0.244	0.508	0.293	0.262	0.356	0.259	0.197	0.132	0.889
JS20	0.319	0.263	0.448	0.253	0.509	0.306	0.268	0.311	0.242	0.156	0.102	0.894

Table 25 Cross-loadings: WATER

	PU	PEU	SN	UA	IU	SA	PSE	Inequity	Power	RC	RTC	JS
PU1	0.867	0.622	0.475	0.392	0.393	0.320	0.255	0.225	0.329	-0.146	-0.196	0.433
PU2	0.903	0.660	0.504	0.415	0.387	0.393	0.236	0.304	0.237	-0.096	-0.118	0.460
PU3	0.911	0.757	0.547	0.368	0.485	0.392	0.337	0.357	0.340	-0.167	-0.274	0.526
PU4	0.934	0.766	0.544	0.436	0.491	0.443	0.285	0.298	0.400	-0.182	-0.254	0.499
PU5	0.878	0.711	0.586	0.358	0.485	0.413	0.312	0.284	0.307	-0.163	-0.261	0.576
PU6	0.741	0.593	0.516	0.310	0.342	0.346	0.213	0.188	0.207	-0.067	-0.202	0.390
PEU1	0.664	0.843	0.464	0.313	0.410	0.407	0.344	0.404	0.331	-0.089	-0.160	0.427
PEU2	0.727	0.848	0.548	0.329	0.432	0.395	0.326	0.322	0.349	-0.143	-0.219	0.399
PEU3	0.672	0.897	0.548	0.359	0.490	0.440	0.266	0.328	0.365	-0.194	-0.234	0.442
PEU4	0.693	0.910	0.621	0.306	0.471	0.415	0.462	0.305	0.316	-0.159	-0.253	0.422
PEU5	0.707	0.850	0.601	0.215	0.390	0.309	0.405	0.288	0.219	-0.141	-0.195	0.456
PEU6	0.607	0.836	0.516	0.229	0.398	0.285	0.278	0.251	0.283	-0.124	-0.109	0.348
SN1	0.594	0.635	0.979	0.213	0.428	0.280	0.327	0.263	0.293	-0.109	-0.211	0.440
SN2	0.589	0.611	0.978	0.200	0.382	0.270	0.338	0.248	0.293	-0.079	-0.180	0.445
ATUA1	0.405	0.326	0.194	0.949	0.501	0.788	0.079	0.353	0.389	-0.058	-0.385	0.586
ATUA2	0.398	0.320	0.215	0.940	0.463	0.742	0.071	0.346	0.355	0.039	-0.342	0.568
ATUC1	0.396	0.302	0.167	0.959	0.492	0.769	0.147	0.355	0.344	0.080	-0.306	0.578
ATUC2	0.449	0.338	0.224	0.936	0.518	0.745	0.095	0.355	0.302	0.045	-0.328	0.609
IU1	0.470	0.439	0.375	0.462	0.932	0.365	0.082	0.235	0.366	-0.217	-0.112	0.513
IU2	0.481	0.486	0.367	0.523	0.962	0.466	0.165	0.299	0.374	-0.134	-0.137	0.508
IU3	0.461	0.497	0.438	0.497	0.952	0.449	0.137	0.252	0.335	-0.192	-0.125	0.506
SA1	0.387	0.354	0.211	0.728	0.384	0.922	0.143	0.302	0.245	0.171	-0.246	0.610
SA2	0.384	0.449	0.276	0.688	0.408	0.922	0.297	0.324	0.289	0.168	-0.270	0.546
SA3	0.429	0.387	0.279	0.769	0.436	0.875	0.176	0.297	0.391	0.062	-0.422	0.554
PSE1	0.238	0.361	0.272	-0.017	0.097	0.133	0.935	0.507	0.215	0.309	0.183	0.173
PSE2	0.317	0.370	0.349	0.122	0.120	0.223	0.945	0.530	0.244	0.250	0.070	0.315
PP1	0.333	0.396	0.337	0.203	0.169	0.284	0.913	0.600	0.324	0.266	0.044	0.329
PP2	0.355	0.415	0.378	0.309	0.288	0.339	0.644	0.795	0.385	0.151	-0.005	0.428
PP3	0.317	0.355	0.275	0.226	0.206	0.270	0.598	0.716	0.316	0.193	0.093	0.303
PI1	0.411	0.463	0.368	0.288	0.343	0.328	0.261	0.445	0.876	-0.121	-0.330	0.488
PI2	0.306	0.251	0.230	0.342	0.307	0.273	0.188	0.428	0.898	-0.092	-0.451	0.466
RTAA1	-0.032	-0.104	-0.030	0.190	-0.118	0.212	0.192	0.227	0.073	0.632	0.061	0.186
RTAA2	-0.139	-0.154	-0.159	0.081	-0.130	0.115	0.234	0.203	-0.086	0.866	0.354	0.044
RTAA3	-0.100	-0.153	-0.024	0.088	-0.084	0.168	0.341	0.275	0.050	0.781	0.352	0.129
RTAA4	-0.014	0.001	0.027	-0.008	-0.131	0.155	0.337	0.210	-0.207	0.879	0.435	0.073
RTAC1	-0.176	-0.127	-0.134	-0.027	-0.168	0.100	0.235	0.185	-0.166	0.922	0.450	0.001
RTAC2	-0.222	-0.201	-0.058	0.010	-0.217	0.087	0.188	0.184	-0.097	0.857	0.415	0.065
RTAC3	-0.228	-0.229	-0.169	-0.115	-0.250	0.060	0.214	0.184	-0.154	0.893	0.465	-0.015
RTB1	0.191	0.181	0.021	0.074	0.315	0.165	0.346	0.207	0.009	0.222	0.382	0.112
RTB2	0.023	-0.018	0.000	-0.160	0.019	-0.099	0.271	0.148	-0.198	0.520	0.801	0.097
RTB3	-0.085	-0.077	-0.026	-0.054	0.155	-0.078	0.125	0.208	-0.132	0.397	0.680	0.146
RTB4	0.104	0.129	-0.035	-0.023	0.153	-0.018	0.314	0.273	-0.122	0.382	0.680	0.073
JS1	0.330	0.339	0.372	0.357	0.257	0.376	0.303	0.441	0.367	0.236	-0.138	0.619
JS2	0.190	0.175	0.004	0.233	0.194	0.193	0.203	0.348	0.236	0.227	0.078	0.419
JS3	0.478	0.427	0.341	0.549	0.346	0.528	0.156	0.364	0.377	-0.007	-0.164	0.736
JS4	0.295	0.337	0.172	0.429	0.286	0.462	0.316	0.401	0.288	0.159	-0.045	0.725
JS5	0.361	0.361	0.308	0.450	0.451	0.490	0.278	0.404	0.344	0.158	-0.175	0.736
JS6	0.298	0.287	0.303	0.270	0.301	0.300	0.165	0.308	0.349	0.071	-0.158	0.638
JS7	0.464	0.442	0.434	0.436	0.449	0.503	0.308	0.423	0.418	0.073	-0.161	0.817
JS8	0.522	0.400	0.369	0.454	0.340	0.543	0.270	0.267	0.288	0.077	-0.171	0.752
JS9	0.501	0.410	0.466	0.554	0.502	0.552	0.187	0.376	0.463	0.048	-0.272	0.844
JS10	0.471	0.353	0.336	0.534	0.474	0.513	0.225	0.341	0.353	0.086	-0.197	0.827
JS11	0.447	0.382	0.415	0.545	0.477	0.534	0.168	0.348	0.506	-0.006	-0.255	0.818
JS12	0.536	0.492	0.485	0.477	0.485	0.558	0.278	0.437	0.458	-0.078	-0.239	0.818
JS13	0.407	0.411	0.383	0.459	0.434	0.521	0.202	0.453	0.357	0.064	-0.183	0.826
JS14	0.437	0.353	0.279	0.521	0.401	0.453	0.244	0.422	0.446	-0.013	-0.228	0.748
JS15	0.417	0.341	0.209	0.440	0.404	0.448	0.261	0.302	0.348	0.079	-0.178	0.731
JS16	0.477	0.387	0.319	0.506	0.417	0.472	0.143	0.336	0.366	0.058	-0.199	0.726
JS17	0.418	0.367	0.406	0.550	0.455	0.548	0.236	0.472	0.470	0.074	-0.230	0.905
JS18	0.432	0.352	0.424	0.545	0.520	0.507	0.184	0.378	0.452	-0.039	-0.306	0.858
JS19	0.402	0.336	0.321	0.515	0.445	0.449	0.150	0.367	0.412	0.066	-0.222	0.815
JS20	0.471	0.376	0.398	0.542	0.480	0.546	0.189	0.382	0.399	0.021	-0.195	0.898

A summary of the latent mean of all constructs is shown in Table 26. More details of the mean comparison are furnished in Appendix B.

Table 26 Descriptive statistics of the three cases

Construct Group	Acronym	POSTAL (N = 107)	ENERGY (N=483)	WATER (N=100)
User Acceptance	PU	3.48	3.27	3.44
	PEU	3.15	2.93	2.97
	SN	3.15	3.01	3.03
	ATU	3.57	3.40	3.53
	IU	3.36	3.34	3.20
	SA	3.43	3.29	3.27
User Resistance	PSE	3.40	3.01	2.97
	PP	2.67	2.61	2.37
	PI	3.05	3.00	2.74
	RTA	2.42	2.37	2.21
	RTB	2.55	2.53	2.27
Job-related Outcomes	JS	3.26	3.05	3.21

4.4 Empirical Assessment of Theoretical Models

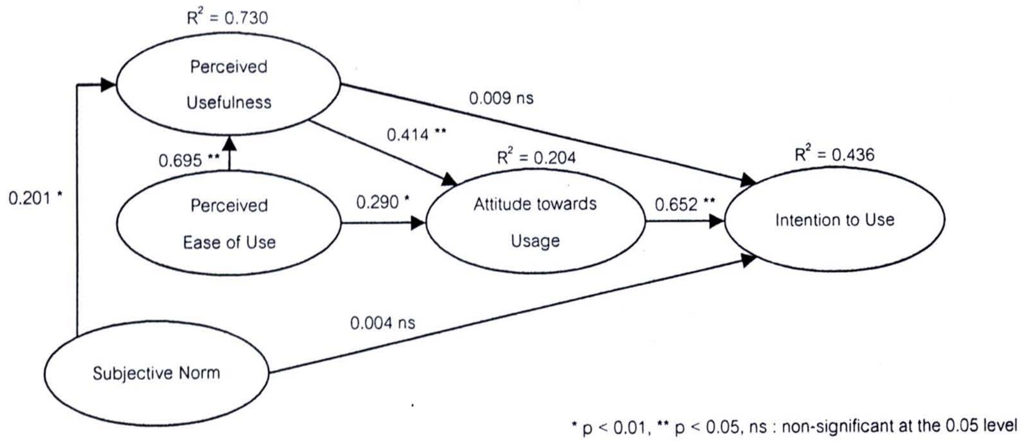
This section illustrates the results of the empirical assessment of the theoretical models pertinent to the research questions of this study: TAM, Resistance to Change, and the proposed model. Theoretical models were tested with data obtained from the three cases. A PLS approach to SEM with bootstrap sub-sampling (n = 1,000) was employed. First, two versions of TAM conceptualized with two different dependent variables were tested, namely, system usage and symbolic adoption. This was to examine the extent to which antecedents in TAM could predict symbolic adoption in mandatory-use context. Second, models with constructs derived from the resistance to change theories were tested. Lastly, the proposed models were empirically assessed.

4.4.1 Empirical Assessment of Technology Acceptance Model

To broadly examine how users react with a mandatory-use system, TAM with SN and ATU included was tested with data from the three organizations. This was to show the general application of the use of TAM in this particular setting. Even though the relationship between an intention to use and its determinants is statistically significant, TAM still offers limited explanations to the question related to user acceptance, as discussed in the previous chapters.

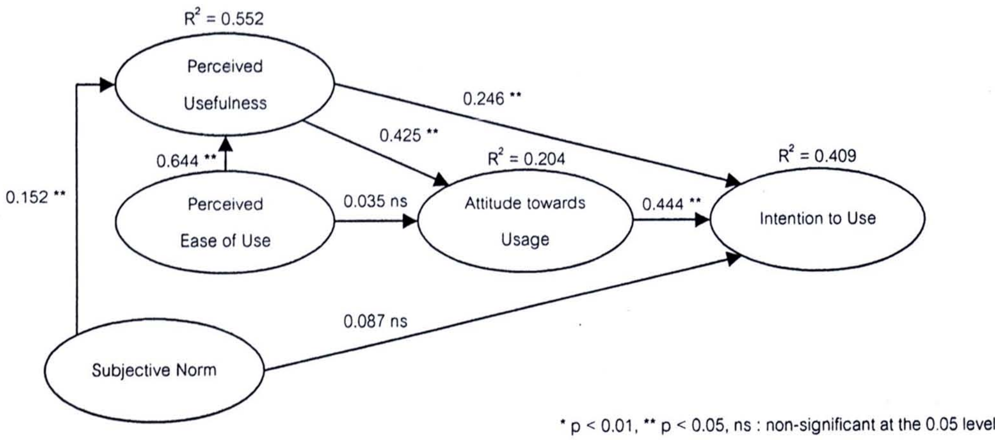
Postal

Most hypothesized paths were statistically significant at 0.01 level. ATU, one out of three, was found to be a statistically significant antecedent of IU ($t = 5.716$, $p < 0.01$). On the one hand, the other two antecedents with no statistical significant relationship were antecedents that were PU and SN ($t = 0.101$, $p > 0.05$ and $t = 0.072$, $p > 0.05$). These three constructs jointly explained the 43.6% of variance in Intention to use. Both PU and PEU were found to be a statistically significant determinant of ATU and explained 20.4% of the variance.



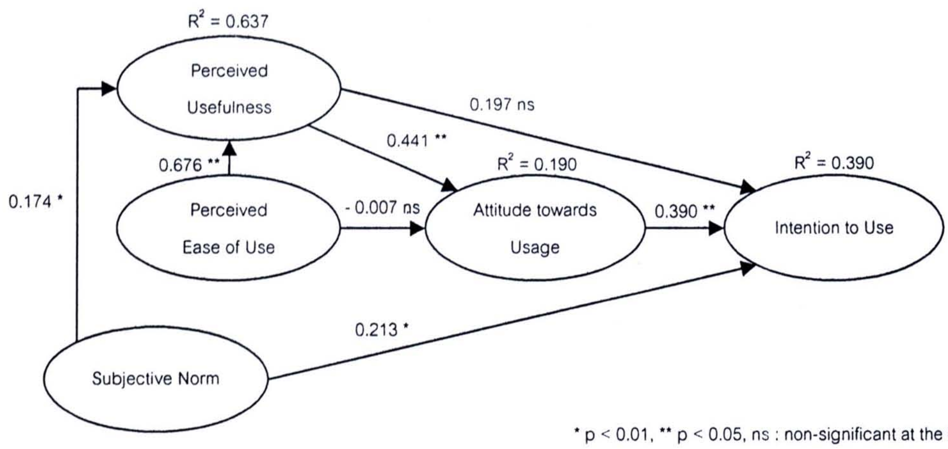
Energy

The results show that there were only two paths found not to be statistically significant: the path from PEU to ATU (t = 0.694, p > 0.05) and the other path from SN to IU (t = 1.734, p > 0.05). Other hypothesized relationships were statistically significant at 0.01 level. The 20.4% of the variance in ATU was explained by PEU and PU. ATU was a significant antecedent of IU (t = 5.677, p < 0.01) and together with SN explained 40.9% of the variance in IU.



Water

The results of this empirical assessment in the case of WATER are somewhat different from the results of the previous two cases. ATU and SN appear to be a primary significant determinant of IU ($t = 2.685$, $p < 0.01$ and $t = 2.079$, $p < 0.05$). PU were not found to be a statistically significant antecedent of IU ($t = 1.339$, $p > 0.05$). The path from SN to PU was statistically significant ($t = 1.966$, $p < 0.05$). The variance in IU was explained by three theoretical constructs, about 39.0%. The 19.0% of variance in ATU was explained by PU and PEU.



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

4.4 Empirical Assessment of Theoretical Models

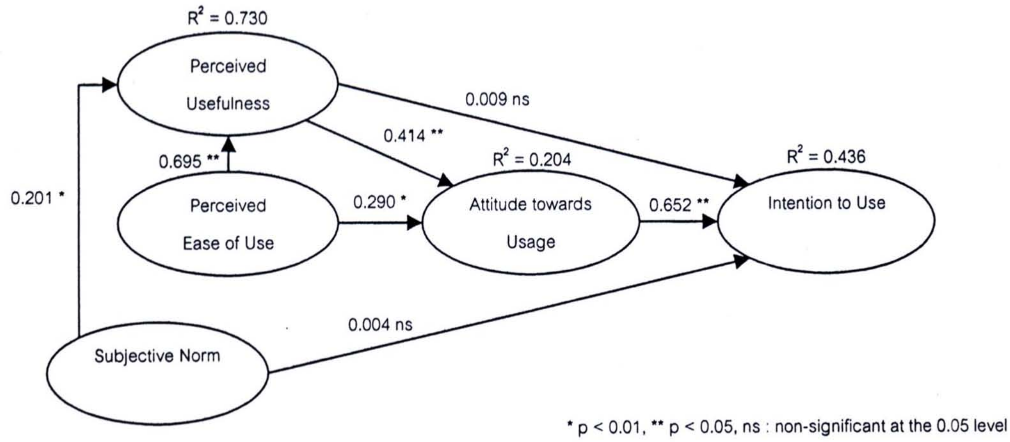
This section illustrates the results of the empirical assessment of the theoretical models pertinent to the research questions of this study: TAM, Resistance to Change, and the proposed model. Theoretical models were tested with data obtained from the three cases. A PLS approach to SEM with bootstrap sub-sampling (n = 1,000) was employed. First, two versions of TAM conceptualized with two different dependent variables were tested, namely, system usage and symbolic adoption. This was to examine the extent to which antecedents in TAM could predict symbolic adoption in mandatory-use context. Second, models with constructs derived from the resistance to change theories were tested. Lastly, the proposed models were empirically assessed.

4.4.1 Empirical Assessment of Technology Acceptance Model

To broadly examine how users react with a mandatory-use system, TAM with SN and ATU included was tested with data from the three organizations. This was to show the general application of the use of TAM in this particular setting. Even though the relationship between an intention to use and its determinants is statistically significant, TAM still offers limited explanations to the question related to user acceptance, as discussed in the previous chapters.

Postal

Most hypothesized paths were statistically significant at 0.01 level. ATU, one out of three, was found to be a statistically significant antecedent of IU (t = 5.716, p < 0.01). On the one hand, the other two antecedents with no statistical significant relationship were antecedents that were PU and SN (t = 0.101, p > 0.05 and t = 0.072, p > 0.05). These three constructs jointly explained the 43.6% of variance in Intention to use. Both PU and PEU were found to be a statistically significant determinant of ATU and explained 20.4% of the variance.

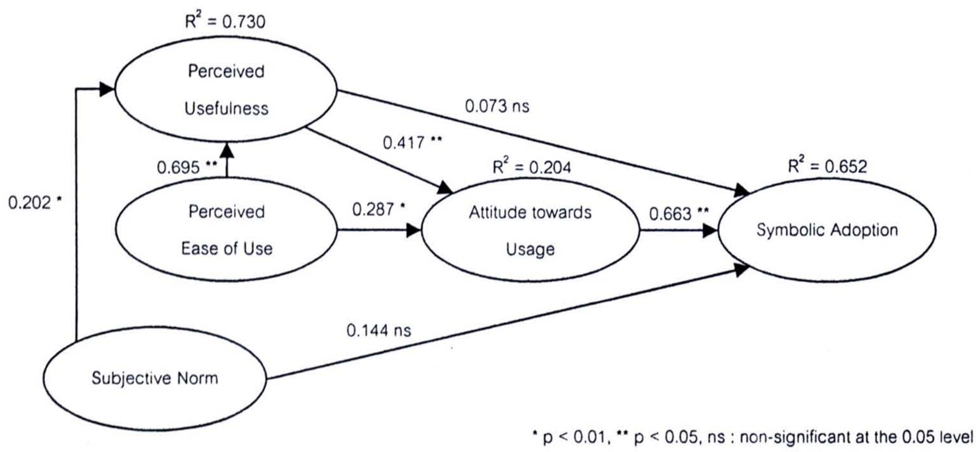


4.4.2 Empirical Assessment of Technology Acceptance Model with Symbolic Adoption as a Dependent Variable

As the literature suggests, SA should be placed as a dependent variable when the usage is mandatory. Some researchers have shown that PU, PEU and ATU are significant determinants of SA (Nah et al., 2004). Following TAM conceptualization, these sub-models would be empirically assessed to explore to what extent TAM original determinants could predict SA. PU, PEU, and SN were hypothesized to predict a level of SA in the mandatory-usage setting.

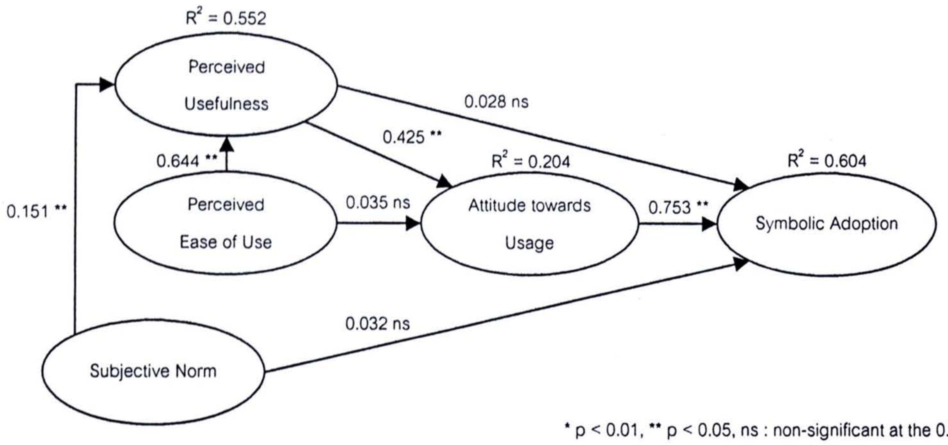
Postal

Most hypothesized relationships were statistically significant at 0.01 level. Two out of three theorized determinants were not found to be a statistical significant determinant. SN was not found to be statistically significantly related with SA ($t = 1.323$, $p > 0.05$). The relationship between PU and SA was not statistically significant ($t = 0.711$, $p > 0.05$). This left ATU to be the only statistical significant determinant of SA ($t = 5.749$, $p < 0.01$). The three constructs, PU, ATU, and SN, jointly explained the 65.2% of variance in SA. The 20.4% variance of ATU were both explained and determined by PU and PEU ($t = 3.438$, $p < 0.01$ and $t = 2.302$, $p > 0.05$).



Energy

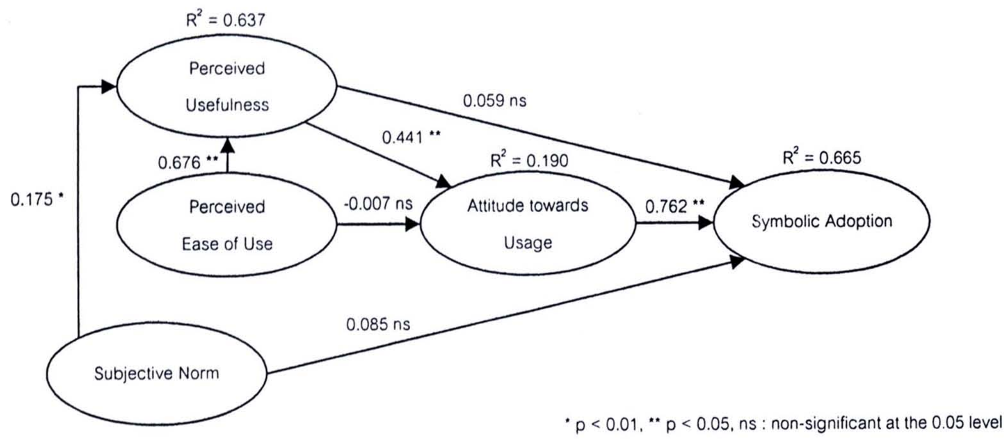
Most hypothesized relationships were statistically significant at 0.01 level. Three paths were not found to be statistically significant. These include paths from PEU to ATU ($t = 0.685$, $p > 0.05$), from PU to SA ($t = 0.832$, $p > 0.05$), and from SN to SA ($t = 1.039$, $p > 0.05$). The relationship between ATU and SA appears to be relatively high ($b = 0.753$, $p < 0.01$). The 60.44% of the variance in SA was explained by PU, ATU, and SN.



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

Water

The results obtained from the case of WATER are quite uncommon. There were only two statistically significant paths: the path from PEU to PU ($t = 6.617$, $p < 0.01$) and the path from ATU to SA ($t = 6.231$, $p < 0.01$). Apart from ATU, the other two theorized determinants, PU and SN, were not statistically significantly related with SA ($t = 0.740$, $p > 0.05$ and $t = 1.211$, $p > 0.05$, respectively). These three constructs together explained 68.1% of the variance in SA. In addition, ATU was not statistically significantly related with the two hypothesized antecedents; PU and PEU ($t = 1.927$, $p > 0.05$ and $t = 0.222$, $p > 0.05$, correspondingly).



that SN was not significantly related to IU, the effect of this social influence is most likely to enhance the level of PU.

In summary, the findings seem to confirm most of the results found in previous studies. Perceived usefulness is the primary determinant of an intention to use mediated by attitude towards the system usage. Since users might feel that ERP was quite difficult to operate, perceived ease of use did not directly influence attitude towards system usage but helped to improve the perception of usefulness.

Table 27 Summary of structural model path coefficients and explained variance of the empirical assessment of technology acceptance model

	Structural model path coefficients		
	POSTAL	ENERGY	WATER
PEU → PU	0.695 **	0.644 **	0.676 **
SN → PU	0.201 *	0.152 **	0.174 *
PEU → ATU	0.290 *	0.035 ns	-0.007 ns
PU → ATU	0.414 **	0.425 **	0.441 **
PU → IU	0.009 ns	0.246 **	0.197 ns
ATU → IU	0.652 **	0.444 **	0.390 **
SN → IU	0.004 ns	0.087 ns	0.213 *
Variance explained in PU	73.0%	55.2%	63.7%
Variance explained in ATU	20.4%	24.6%	19.0%
Variance explained in IU	43.6%	40.9%	39.0%

Table 28 Summary of structural model path coefficients and explained variance of the empirical assessment of technology acceptance model with symbolic adoption as a dependent variable

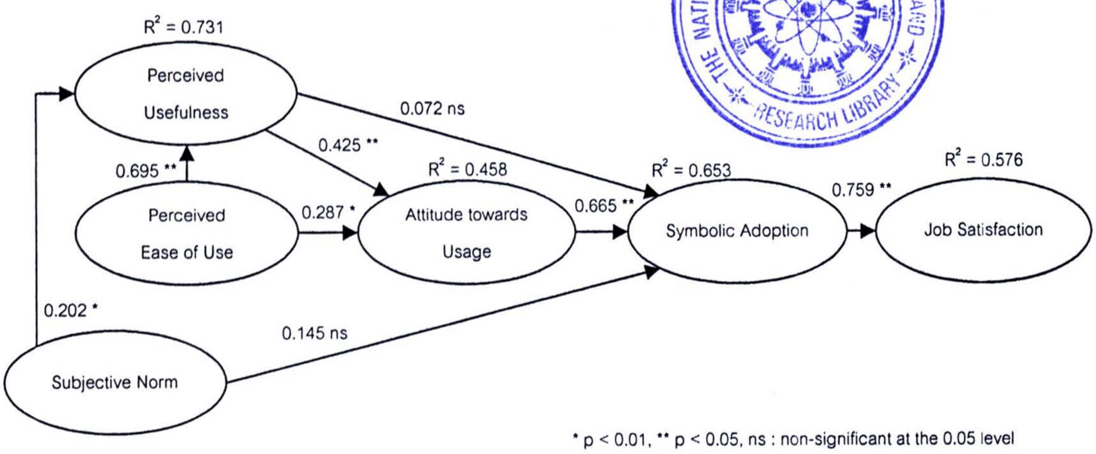
	Structural model path coefficients		
	POSTAL	ENERGY	WATER
PEU → PU	0.695 **	0.644 **	0.676 **
SN → PU	0.202 *	0.151 **	0.175 *
PEU → ATU	0.287 *	0.035 ns	-0.007 ns
PU → ATU	0.417 **	0.425 **	0.441 **
PU → SA	0.073 ns	0.028 ns	0.076 ns
ATU → SA	0.663 **	0.753 **	0.762 **
SN → SA	0.144 ns	0.032 ns	0.085 ns
Variance explained in PU	73.0%	55.2%	63.7%
Variance explained in ATU	20.4%	20.4%	19.0%
Variance explained in SA	65.2%	60.4%	66.5%

4.4.3 Empirical Assessment of Technology Acceptance Model with Symbolic Adoption predicting Job-Related Outcomes Variable

To address one of the research questions in this study: To what extent are job-related outcomes affected by user acceptance and user resistance in a mandatory-use context? The sub-models of TAM with SA predicting job-related outcomes were tested to examine the relationship between user acceptance and job-related outcomes.

Postal

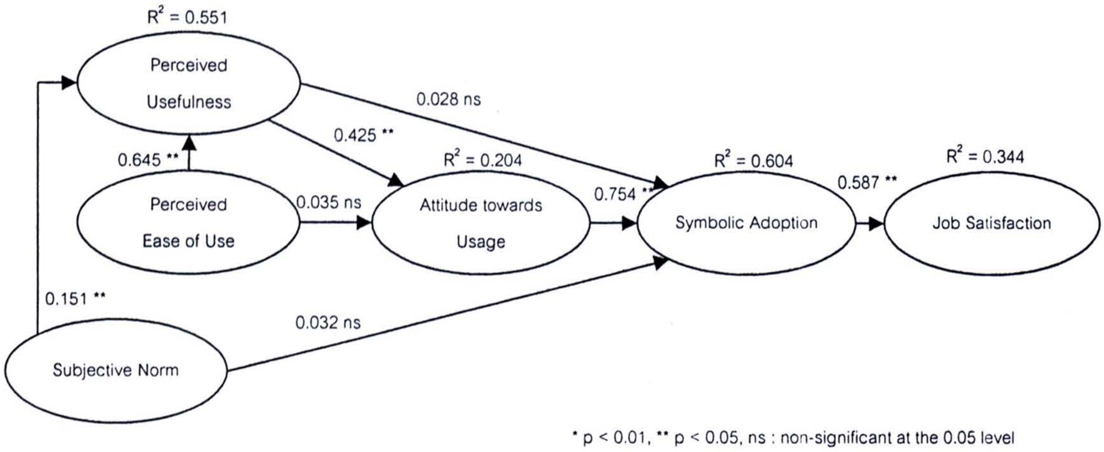
There are two hypothesized paths that were not found to be statistically significant at 0.05 level. PU was not statistically positively significantly related to SA (t = 0.771, p > 0.05). And the relationship between SN and SA was not statistically significant (t = 1.522, p > 0.05). Thus, ATU was the primary determinant of SA (b = 0.665, t = 7.838, p < 0.01). The variance of SA was explained by the three variables, about 65.3%. The results suggest that SA was relatively highly related with JS (b = 0.759, t = 15.345, p < 0.01).



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

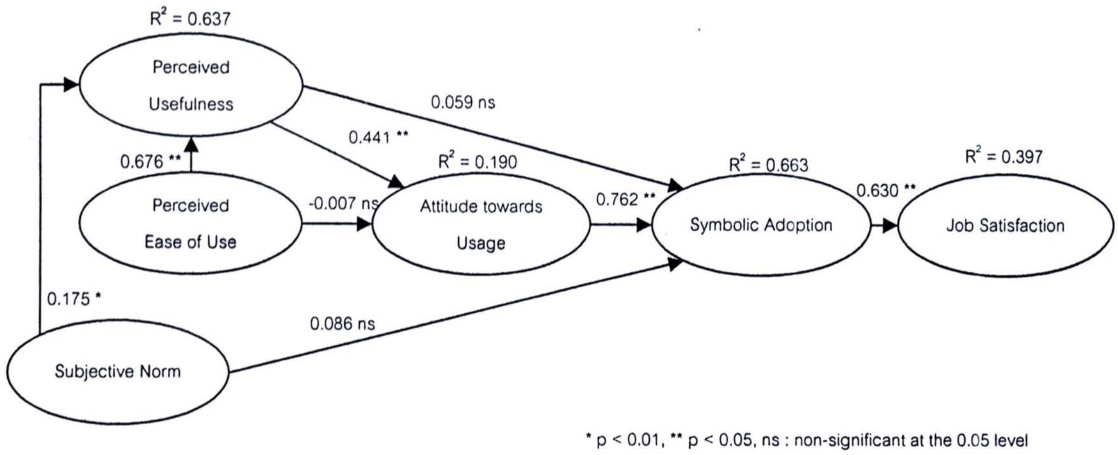
Energy

When symbolic adoption was hypothesized to have a positive direct effect on job satisfaction, the results show that both hypothesized paths were statistically significant ($t = 8.760$, $p < 0.01$). ATU seems to be a relatively strong determinant of SA ($b = 0.754$, $t = 14.204$, $p < 0.01$), while PU and SN were not statistically significantly related with SA ($t = 0.641$, $p > 0.05$ and $t = 0.811$, $p > 0.05$, respectively). ATU, PU, and SN together explained 60.4% of the variance in SA.



Water

The results suggest that ATU was a major determinant of SA. ATU is relatively highly correlated with SA at 0.01 statistically significant (b = 0.762, t = 6.635, $p < 0.01$), whereas the other two hypothesized determinants, PU and SN, were not found to be statistically significantly related with SA (t = 0.417, $p > 0.05$ and t = 1.238, $p > 0.05$, respectively). The 66.3% variance of SA was jointly explained by ATU, PU, and SN. Furthermore, SA was statistically significantly related with JS (t = 7.649, $p < 0.01$).



Summary of the Empirical Assessment of Technology Acceptance Model with Symbolic Adoption predicting Job-Related Outcomes

Table 29 presents path coefficients, explained variance, and statistical significance from the three structural models. When SA is conceptualized to predict job-related outcomes, the evidence from the three cases suggests that SA could significantly predict JS. The relationships between SA and JS are moderately high (the path coefficients range from 0.63 to 0.76, approximately). It is probable that an individual with a more positive attitude towards usage will have a higher degree of symbolic adoption. They will be more accepting of the idea of adopting this particular technology. With a high level of symbolic adoption, an individual will have high job satisfaction.

Table 29 Summary of structural model path coefficients and explained variance of the empirical assessment of technology acceptance model with symbolic adoption as a dependent variable predicting job-related outcomes

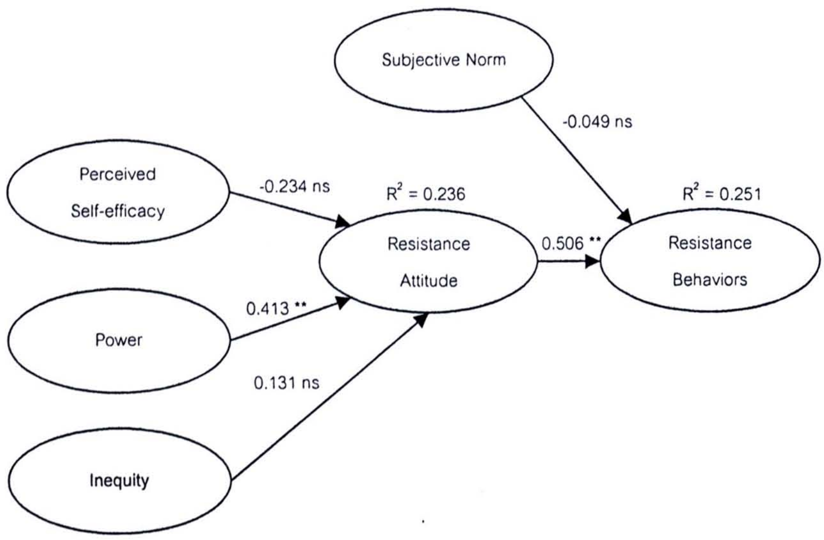
	Structural model path coefficients		
	POSTAL	ENERGY	WATER
PEU → PU	0.695 **	0.645 **	0.676 *
SN → PU	0.202 *	0.151 **	0.175 *
PEU → ATU	0.287 *	0.035 ns	-0.007 ns
PU → ATU	0.425 **	0.425 **	0.441 *
PU → SA	0.072 ns	0.028 ns	0.059 ns
ATU → SA	0.665 **	0.754 **	0.762 **
SN → SA	0.145 ns	0.032 ns	0.085 ns
SA → JS	0.759 **	0.587 **	0.630 **
Variance explained in PU	73.1%	55.1%	63.7%
Variance explained in ATU	45.8%	20.4%	19.0%
Variance explained in SA	65.3%	60.4%	66.3%
Variance explained in JS	57.6%	34.4%	39.7%

4.4.4 Empirical Assessment of Resistance to IS implementation Model

Resistance to IS implementation sub-models was empirically assessed in order to examine what could potentially influence resistance to IS implementation. PSE, PP, and PI were hypothesized to influence resistance attitude which, in turn, jointly determine resistance behaviors with SN.

Postal

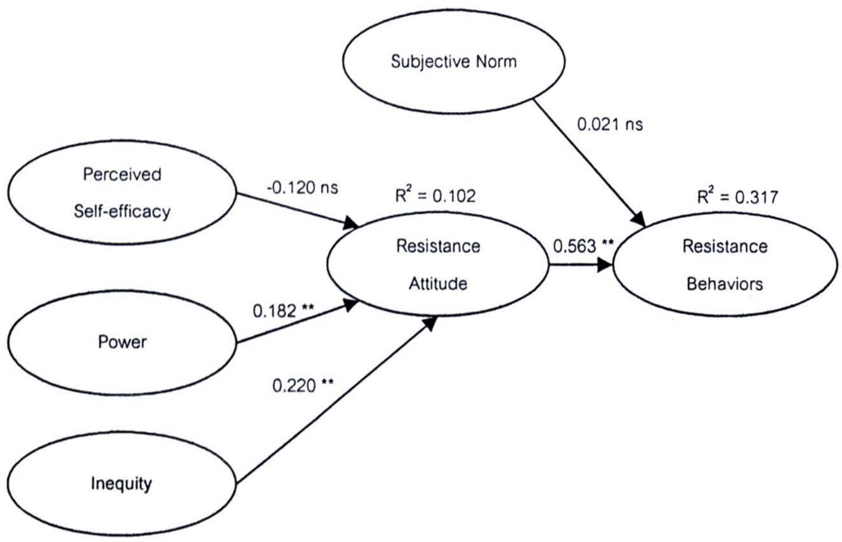
Only PP was statistically significantly related to RTA ($t = 4.234$, $p < 0.01$), whereas, PSE and PI were not a statistically significant determinant of RTA ($t = 1.915$, $p > 0.05$ and $t = 1.165$, $p > 0.05$, correspondingly). These three constructs jointly explained 23.6% variance in RTA. The relationship between RTA and RTB was statistically significant ($t = 5.431$, $p < 0.01$). However, SN was not found to be statistically significantly related to RTB ($t = 0.376$, $p > 0.05$). The 25.1% of variance in RTB was explained by RTA and SN.



* $p < 0.01$, ** $p < 0.05$, ns : non-significant at the 0.05 level

ENERGY

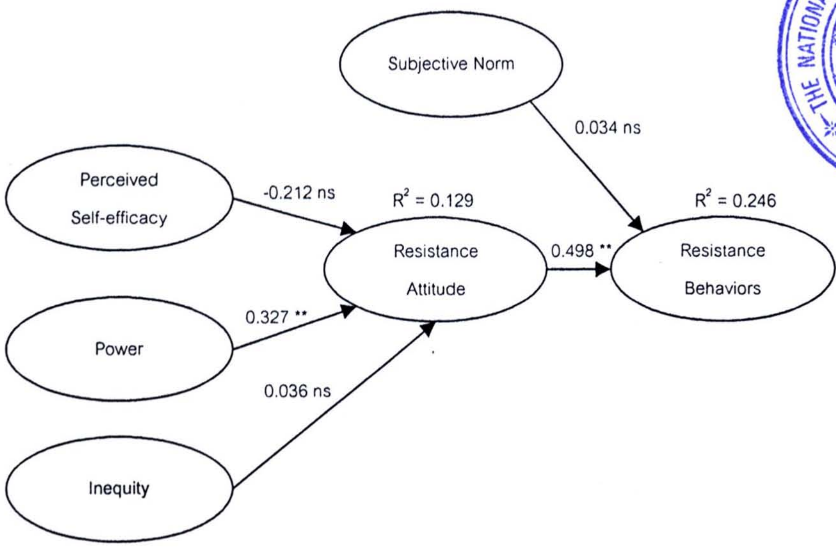
Two of three hypothesized antecedents of RTA were found to be statistically significant; PP and PI. The relationship between PSE and RTA was not statistically significant ($t = 1.370$, $p > 0.05$). These three antecedents jointly explained 10.2% of variance in RTA. The variance explained seems to be somewhat low. RTB were significantly related to only RTA ($t = 12.075$, $p < 0.01$). SN was not found to significantly influent RTB ($t = 0.401$, $p > 0.05$).



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

WATER

Two of the three hypothesized determinants of RTA were not found to be statistically significant (t = 1.191, p > 0.05 and t = 0.261, p > 0.05 for PSE and PI, respectively). PP was significantly related to RTA (t = 2.850, p < 0.01). There were two hypothesized antecedents of RTB: RTA and SN. RTA was moderately correlated with RTB at 0.01 statistical significant level (t = 5.381, p < 0.01), while SN was not statistically significantly related to RTB (t = 0.373, p > 0.05). 24.6% of the variance in RTB was explained by these two constructs.



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

Summary of the Empirical Assessment of Resistance to IS implementation Model

Path coefficients, explained variance, and statistical significance from three structural models are shown in Table 30. PSE, PP, and PI were hypothesized to be determinants of RTA. It appears that PP statistically significantly determined RTA in all three cases. It could be assumed that an individual with a higher level of power in an organization tends to develop resistance attitude towards the system implementation.

Moreover, the perception of inequity would lead an individual to have a high resistance attitude during the phase of implementation. However, the variance in RTA jointly explained by these three constructs was approximately about 25% – 30%. The degree of explained variance was not very high.

Table 30 Summary of structural model path coefficients and explained variance of the empirical assessment of resistance to change model

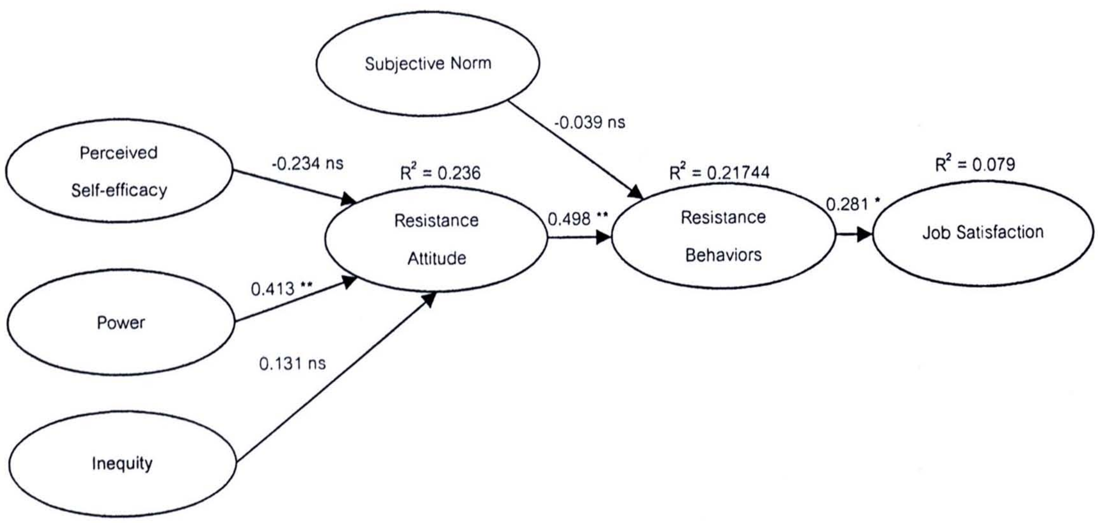
	Structural model path coefficients		
	POSTAL	ENERGY	WATER
PSE → RTA	-0.234 ns	-0.120 ns	-0.212 ns
PP → RTA	0.413 **	0.182 **	0.327 **
PI → RTA	0.131 ns	0.220 **	0.036 ns
SN → RTB	- 0.049 ns	0.075 ns	0.034 ns
RTA → RTB	0.506 **	0.563 **	0.498 **
Variance explained in RTA	23.6%	10.2%	12.9%
Variance explained in RTB	25.1%	31.7%	24.6%

4.4.5 Empirical Assessment of Resistance to Change Predicting Job-related Outcomes

One of the research objectives was to examine the consequences of user resistance in the context of mandatory-usage. Resistance behaviors were expected to negatively influence job-related outcomes. This will help to understand how resistance to IS implementation would affect job-related outcomes in this particular context.

POSTAL

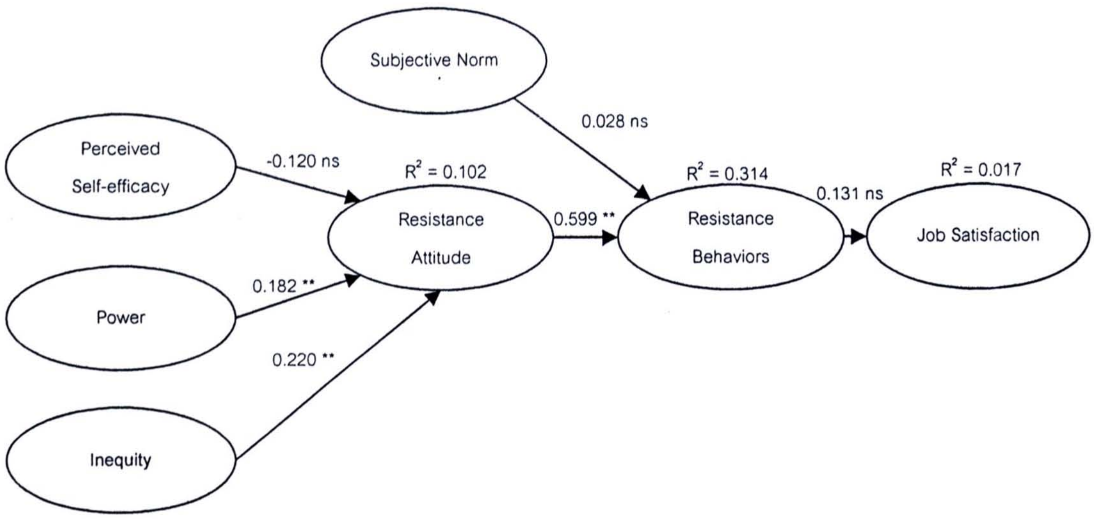
JS was found to be positively directly related to RTB ($t = 2.203$, $p < 0.05$). The variance in JS was explained by RTB about 7.9%. SN was not directly related to RTB ($t = 0.393$, $p > 0.05$). Only RTA was found to be a primary determinant of RTB ($t = 4.709$, $p < 0.01$).Only PP, one of three hypothesized antecedents of RTA, was statistically significantly related to RTA ($t = 4.503$, $p < 0.01$).



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

ENERGY

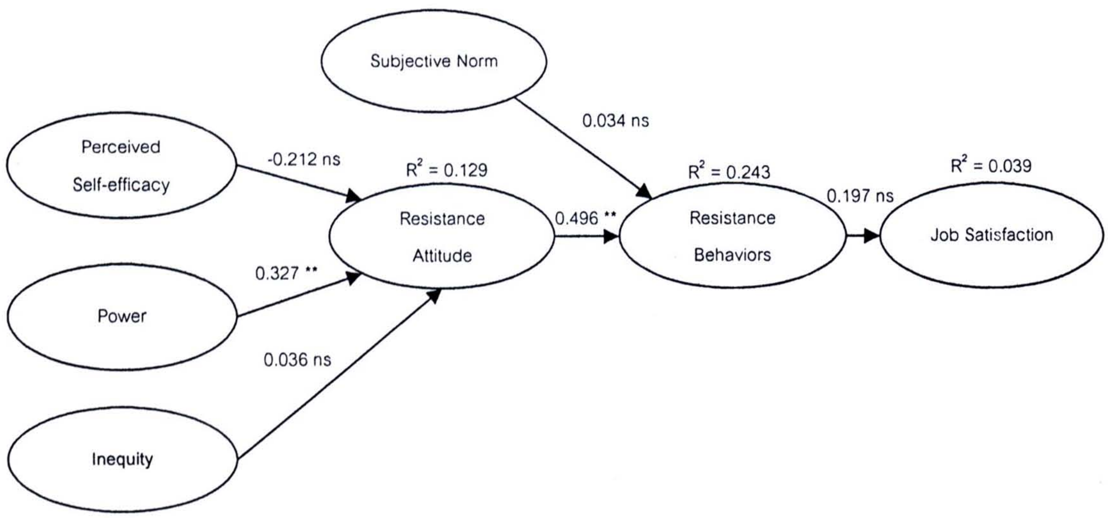
Similar to the results found in the case of POSTAL, RTB was not statistically significantly correlated with JS (t = 1.649, $p > 0.05$). RTB was statistically significantly determined only by RTA (t = 12.423, $p < 0.01$) since the relationship between SN and RTB was not significant (t = 0.526, $p > 0.05$). RTA was directly influenced by PP and PI (t = 2.774, $p < 0.01$ and t = 3.707, $p < 0.01$).



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

WATER

The relationship between RTB and JS was not statistically significant (t = 0.900, p > 0.05). About 2.3% of variance in JS was explained by RTB. The relationship between RTA and RTB was moderate (b = 0.496, t = 5.123, p < 0.01). SN was not statistically significantly related to RTB (t = 0.370, p > 0.05). Only PP was significantly correlated with RTA (t = 2.816, p < 0.01). However, PSE and PI, the other hypothesize determinants, did not significantly influence RTA (t = 1.179, p > 0.05 and t = 0.264, p > 0.05).



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

Summary of the Empirical Assessment of Resistance to Change Predicting Job-related Outcomes

Table 31 provides path coefficients, explained variance, and statistical significance from three structural models. The relationship between JS and RTB were insignificant in the case of ENERGY and WATER. However, when the link was significant in the case of POSTAL, RTB was positively related to JS. The interpretation derived from the results would lead to the idea that an individual who expresses resistance behaviors tends to have higher job satisfaction. This argument could provoke debate and encourage criticism. At this point, it would be inaccurate to presume the positive relationship between resistance to IS implementation and job-related outcomes. Further analysis will be conducted to examine this link.

Table 31 Summary of structural model path coefficients and explained variance of the empirical assessment of resistance to change predicting job-related outcomes

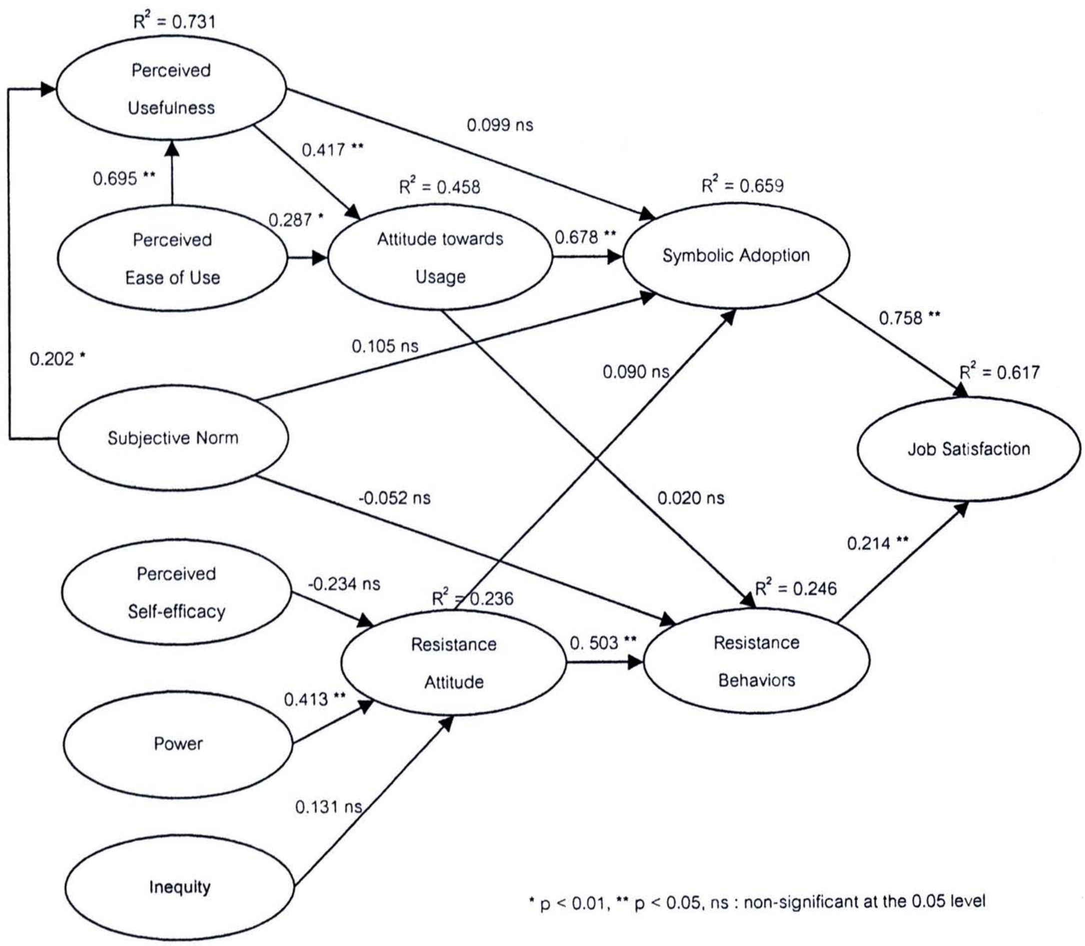
	Structural model path coefficients		
	POSTAL	ENERGY	WATER
PSE → RTA	-0.234 ns	-0.120 ns	-0.212 ns
PP → RTA	0.413 **	0.182 **	0.327 **
PI → RTA	0.131 ns	0.220 **	0.036 ns
SN → RTB	-0.039 ns	0.028 ns	0.034 ns
RTA → RTB	0.498 **	0.559 **	0.496 **
RTB → JS	0.281 *	0.131 ns	0.187 ns
Variance explained in RTA	23.6%	10.2%	12.9%
Variance explained in RTB	24.4%	31.4%	24.3%
Variance explained in JS	7.9%	1.7%	3.9%

4.4.6 Empirical Assessment of the Proposed Model

This section presents the empirical assessment of the model proposed in this study. Three concepts, which are user acceptance, user resistance, and job-related outcomes, are linked together. This is to examine how user acceptance and user resistance are inter-related and jointly affect job-related outcomes. To examine the link between user acceptance and user resistance, the relationships between ATU and RTB, and between RTA and SA are statistically assessed.

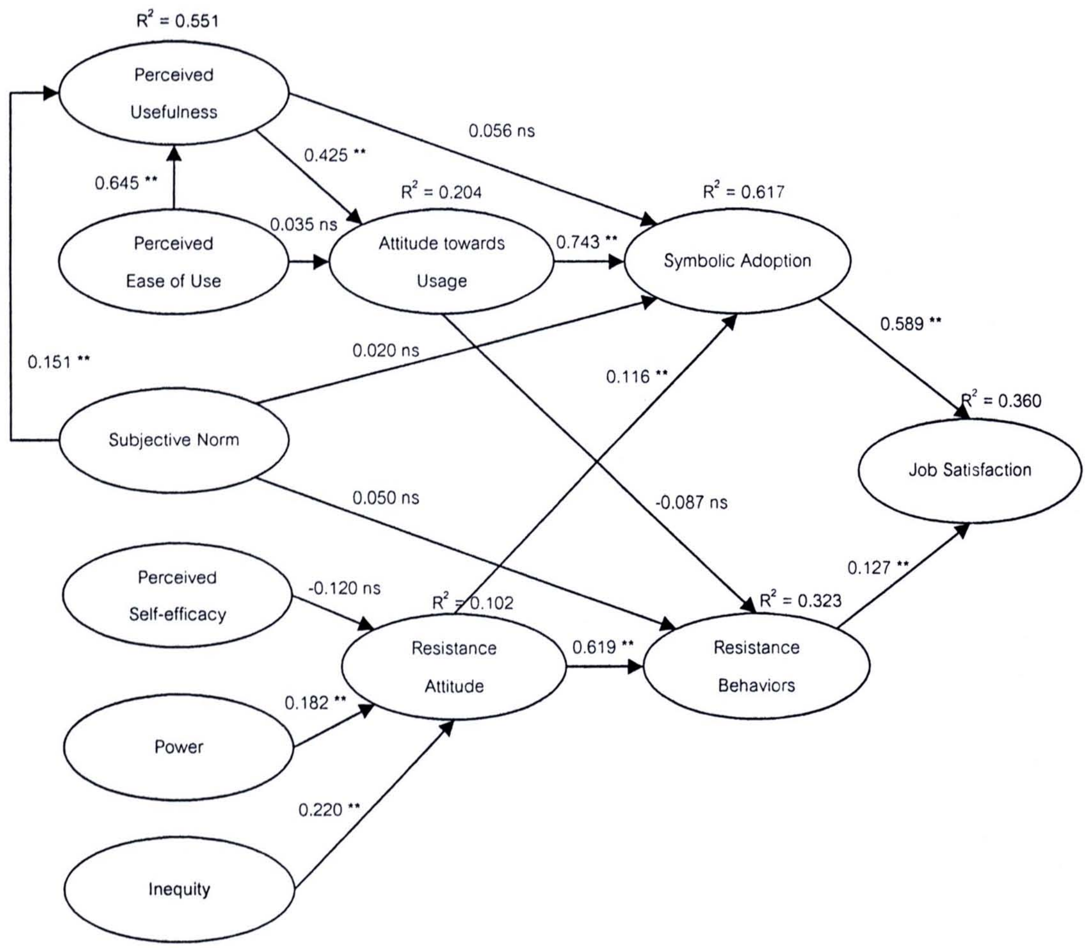
POSTAL

ATU did not statistically significantly determine RTB ($t = 0.174$, $p > 0.05$). Neither did RTA statistically significantly affect SA ($t = 1.242$, $p > 0.05$). RTA and ATU explain the variance in SA and RTB, about 65.9% and 24.6%, respectively. SA and RTB were positively statistically significantly related to JS ($t = 15.277$, $p < 0.01$ and $t = 3.429$, $p < 0.01$).



ENERGY

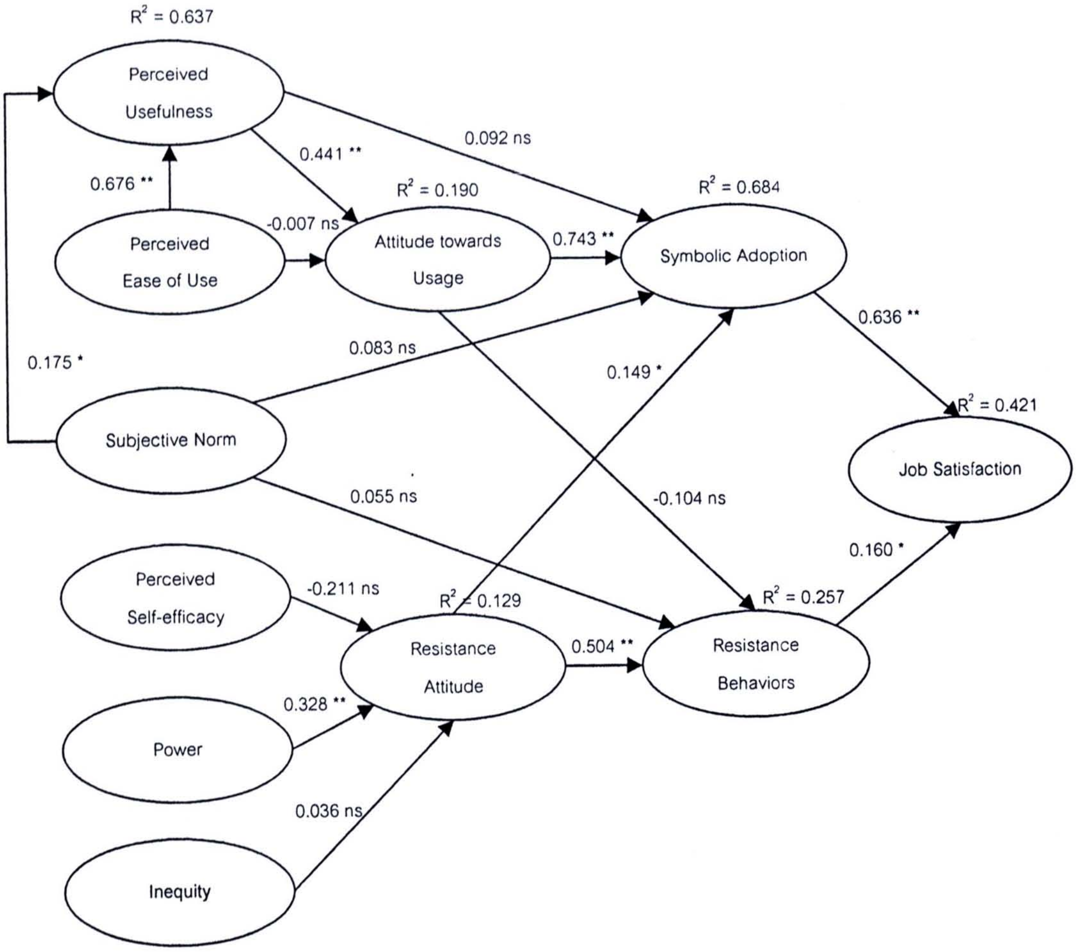
The relationship between ATU and RTB was not statistically significant (t = 1.167, p > 0.05). However, RTA was positively significantly related to SA (t = 2.654, p < 0.01). RTA and ATU explained the variance in SA and RTB, about 61.7% and 32.3%, respectively. Moreover, SA and RTB were positively statistically significantly related to JS (t = 9.172, p < 0.01 and t = 2.603, p < 0.01).



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

WATER

RTA was positively significantly related to SA ($t = 2.356$, $p < 0.05$), whereas ATU was not significantly related to RTB ($t = 0.803$, $p > 0.05$). RTA and ATU mutually explained the variance in SA and RTB, about 68.4% and 25.7%, respectively. SA and RTB were statistically significantly related to JS ($t = 7.471$, $p < 0.01$ and $t = 2.011$, $p < 0.01$).



* $p < 0.01$, ** $p < 0.05$, ns : non-significant at the 0.05 level

Summary of the Empirical Assessment of the Proposed Model

Table 32 provides path coefficients, explained variance, and statistical significance from three structural models. Some important findings are significant and should be emphasized: the effects of user acceptance on job-related outcomes, the effects of user resistance on job-related outcomes, and the relationship between user acceptance and user resistance.

First, the effects of user acceptance were found to be positive. SA was positively statistically significantly related to JS in all cases. It appears that a user who agrees with the idea of using the system will be more satisfied with the ERP jobs. The effects of user acceptance, represented by the level of symbolic adoption, tend to have a positive effect on job-related outcomes.

Second, the effects of user resistance were found to be positive. In all cases, RTB was positively statistically significantly correlated to JS. Intuitively, the effects of resistance to IS implementation would be negative. Resistance to IS implementation would lead individuals to be dissatisfied with, or retract from, their jobs on ERP. Hence, individuals with high resistance to IS implementation would lead to low job satisfaction. The findings here show contrasting results. It may be argued that an individual might be satisfied with the job on ERP after they could freely express resistance behaviors such as protesting or complaining. However, there could be the interaction effect between the effects of user acceptance and user resistance on job satisfaction which will be tested in the next section.

Third, the effects of user acceptance on user resistance were not significant in three cases. It appears that positive attitude towards system usage would not help decrease individual resistance behaviors. Even though users agree to the idea of using the system, their acceptance of this particular system will not discourage them to express their resistance behaviors.

Fourth, the effects of user resistance on user acceptance were found inconsistence among three cases. RTA positively significantly influenced SA in the case of ENERGY and WATER. This may seem to contrast a general belief because resistance attitude is mostly perceived to be negative. It is least likely that negative thoughts and feelings would increase a degree of symbolic adoption. These effects will be explored in the next section.

The effects of user resistance on user acceptance were found to contrast general intuitions. This may stem from the asymmetric effects of resistance (Bhattacherjee and Hikmet, 2007) that makes the relationship between these two concepts perplexing. Further analysis will be performed in the next section to investigate the interaction between user acceptance and user resistance.

Table 32 Summary of structural model path coefficients and explained variance of the proposed model

	Structural model path coefficients		
	POSTAL	ENERGY	WATER
PEU → PU	0.695 **	0.645 **	0.676 **
SN → PU	0.202 *	0.151 **	0.175 *
PEU → ATU	0.287 *	0.035 ns	-0.042 ns
PU → ATU	0.417 **	0.425 **	0.441 **
PU → SA	0.099 ns	0.054 ns	0.092 ns
ATU → SA	0.678 **	0.743 **	0.743 **
SN → SA	0.105 ns	0.020 ns	0.083 ns
RTA → SA	0.020 ns	0.116 **	0.149 *
PSE → RTA	-0.234 ns	-0.120 ns	-0.211ns
PP → RTA	0.413 **	0.182 **	0.328 **
PI → RTA	0.131 ns	0.220 **	0.036 ns
SN → RTB	-0.052 ns	0.050 ns	0.055 ns
RTA → RTB	0.503 **	0.563 **	0.504 **
ATU → RTB	0.020 ns	-0.087 ns	-0.104 ns
SA → JS	0.758 **	0.589 **	0.636 **
RTB → JS	0.214 **	0.127 **	0.160 *
Variance explained in PU	73.1%	55.1%	63.7%
Variance explained in ATU	45.8%	20.4%	19.0%
Variance explained in SA	65.9%	61.7%	68.4%
Variance explained in RTA	23.6%	10.2%	12.9%
Variance explained in RTB	24.6%	32.3%	25.7%
Variance explained in JS	61.7%	36.0%	42.1%

4.4.7 Empirical Assessment of the Proposed Model with Interaction Effects

From the results found in the empirical assessment of the proposed model shown in the previous section, an issue was posed by the relationship between user acceptance and user resistance. Previous studies have found that the effects of user resistance are asymmetric. Cenfetelli (2004b) posited that inhibitors solely discourage usage. However, the lack of inhibitors would not encourage system adoption. Following this theoretical contention, Bhattacherjee and Hikmet (2007) argue that resistance should not be viewed as non-usage. Especially in this particular context where system usage is mandatory, there should not be non-usage. Hence, the relationship between user acceptance and user resistance should not be viewed as simplistic. The interaction between user acceptance and user resistance could be expected.

The form of the relationships between user acceptance and user resistance should be modeled to include interaction effects. Thus, user acceptance could be moderated by user resistance. Since resistance to IS implementation could be expressed passively or actively, user acceptance might be moderated by either resistance attitude or resistance behaviors. How user acceptance is moderated by user resistance would follow theoretical conceptualization. Symbolic adoption is argued to be determined by user attitude. Hence, it should be mainly influenced by user attitude towards system usage and moderated by resistance attitude. Moreover, the relationship between job-related outcomes and symbolic adoption could be moderated by resistance behaviors. In order to empirically assess the moderating role of resistance to IS implementation, the PLS models with data from the three cases were tested.

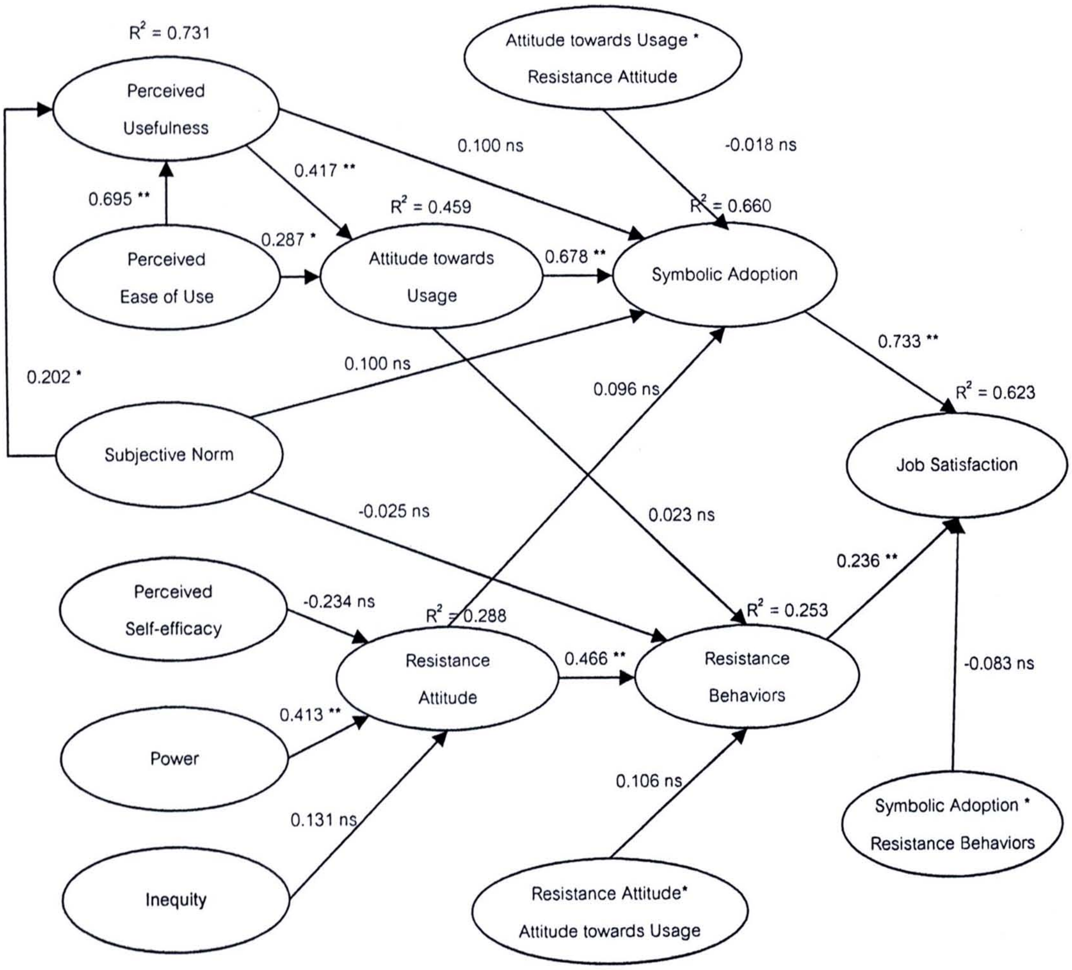
In order to test an interaction effect, this study follows fundamental guidelines suggested by Baron and Kenny (1986). The product variable of the independent variable and the moderator is created in order to use in the PLS models. An interaction effect can be obtained by the built-in feature of smartPLS. The analyses for interaction effects in this study also followed the method illustrated in the study conducted by Chin et al. (1996). Item scores were standardized before multiplication, and then the PLS procedure was used to estimate the interaction effect.

The three moderating effects were introduced into the proposed models: resistance attitude moderating the relationship between attitude towards usage and symbolic adoption, attitude towards usage moderating the relationship between resistance attitude and resistance behaviors, and resistance moderating the relationship between symbolic adoption and job satisfaction. These three interaction effects were created and entered into the proposed model. The PLS models were tested with the three case data separately.

Carte and Russell (2003) indicated nine common errors in testing moderation effects. One group of the errors deals with the inappropriate use and interpretation of statistics. The authors also suggested that the change in R-square should be used as the index of moderator effect size instead of the path coefficients. In addition, the path coefficient of the main effect should not be interpreted when the moderating effect is significant (Carte and Russell, 2003; Venkatesh et al., 2003).

POSTAL

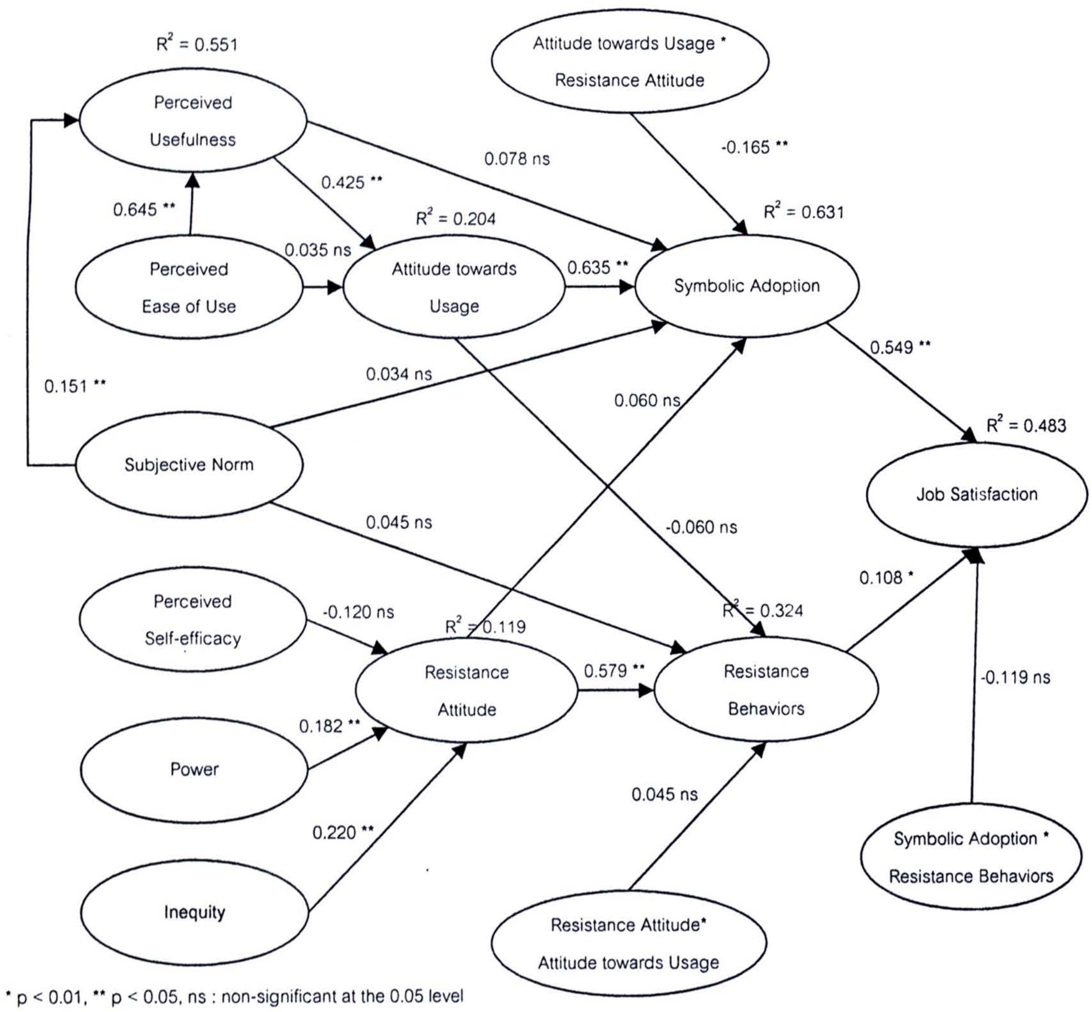
No interaction effects were significant. The interaction effect of ATU and RTA on SA was not significant (t = 0.194, p > 0.05). RTA did not moderate the relationship between ATU and SA (t = 0.583, p > 0.05). The interaction term between SA and RTB was not significantly related to JS (t = 0.800, p > 0.05).



* p < 0.01, ** p < 0.05, ns : non-significant at the 0.05 level

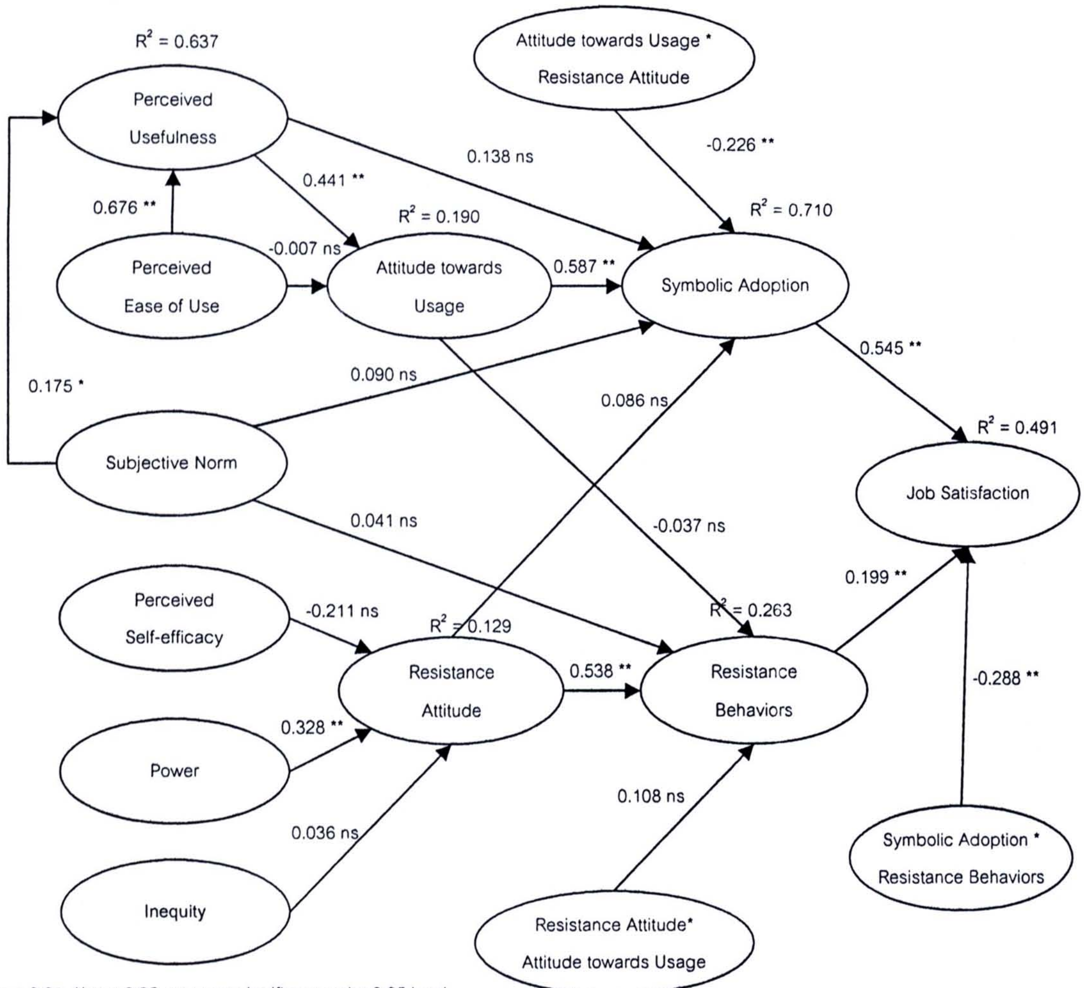
ENERGY

Only one interaction effect was found to be significant. RTA negatively moderated the relationship between ATU and SA ($t = 2.664$, $p < 0.01$). The interaction effect of RTA and ATU on RTB was not significant ($t = 0.477$, $p > 0.05$). RTB did not moderate the relationship between SA and JS ($t = 1.691$, $p > 0.05$).



WATER

Only one interaction effect was insignificant. This is the interaction effect of RTA and ATU on RTB (t = 0.440, $p > 0.05$). For the significant interaction effects, the interaction effect of ATU and RTA on SA was significant (t = 2.665, $p < 0.01$), and the interaction effect between SA and RTB on JS was significant (t = 2.189, $p < 0.05$).



* $p < 0.01$, ** $p < 0.05$, ns : non-significant at the 0.05 level

Summary of the Empirical Assessment of the Proposed Model with Interaction Effects

Table 33 presents path coefficients, explained variance, and statistical significance from three structural models testing the interaction effects. The results from the three cases are inconsistent. In the case of POSTAL, no interaction effects were significant. RTA appears to negatively moderate the relationship between ATU and SA in the case of ENERGY and WATER. This means the higher the RTA, the weaker this relationship. Only in the case of WATER, RTB negatively moderated the effects of SA on JS. The R-square change was 7% (from 42.1% to 49.1%). With the interaction effect taken into account, it seems that resistance behaviors could weaken the positive effects of symbolic adoption on job satisfaction.

Table 33 Summary of structural model path coefficients and explained variance of the proposed model with interaction effects

	Structural model path coefficients		
	POSTAL	ENERGY	WATER
PEU → PU	0.695 **	0.645 **	0.676 **
SN → PU	0.202 *	0.151 **	0.175 *
PEU → ATU	0.287 *	0.035 ns	-0.007 ns
PU → ATU	0.417 **	0.425 **	0.441 **
PU → SA	0.100 ns	0.078 ns	0.138 ns
ATU → SA	0.678 **	0.635 **	0.587 **
SN → SA	0.100 ns	0.034 ns	0.090 ns
RTA → SA	0.020 ns	0.060 ns	0.086 ns
ATU*RTA → SA	-0.018 ns	-0.165 **	-0.226 *
PSE → RTA	-0.234 ns	-0.120 ns	-0.211 ns
PP → RTA	0.413 **	0.182 **	0.328 **
PI → RTA	0.131 ns	0.220 **	0.036 ns
SN → RTB	-0.025 ns	0.045 ns	0.041 ns
RTA → RTB	0.466 **	0.579 **	0.538 **
ATU → RTB	0.023 ns	-0.060 ns	-0.037 ns
RTA*ATU → RTB	0.106 ns	0.045 ns	0.108 ns
SA → JS	0.733 **	0.549 **	0.545 **
RTB → JS	0.236 **	0.108 *	0.199 *
SA*RTB → JS	-0.083 ns	-0.119 ns	-0.288 **
Variance explained in PU	73.1%	55.1%	63.7%
Variance explained in ATU	45.9%	20.4%	19.0%
Variance explained in SA	66.0%	63.1%	71.0%
Variance explained in RTA	23.6%	10.2%	12.9%
Variance explained in RTB	25.3%	32.4%	26.3%
Variance explained in JS	62.3%	37.2%	49.1%

4.5 Summary of Chapter IV

A PLS approach to SEM was employed to empirically assess the proposed theoretical framework. The results of data analysis were presented. The next chapter will discuss the results and conclude the findings of the present study.