



**Modelling intention to use third party logistics: an
application of the theory of planned behaviour**

**A thesis submitted in partial fulfilment of the requirements for the
degree of doctor of philosophy**

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DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis/project is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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TABLE OF CONTENT

DECLARATION	ERROR! BOOKMARK NOT DEFINED.
ACKNOWLEDGEMENTS	II
LISTS OF FIGURES	IX
LISTS OF TABLES	XI
ACRONYMS.....	XII
ABSTRACT	XIV

CHAPTER 1: INTRODUCTION

1.1 Introduction	2
1.2 Aim and question	4
1.3 Rationale of the research	4
1.4 Research methodology	7
1.4.1 Study context: Bangladesh	7
1.4.2 Reserach framework	9
1.4.3 Thesis structure.....	11
1.5 Summary.....	12

CHAPTER 2: THIRD PARTY LOGISTICS - CONCEPT, DEVELOPMENT AND THEORY

2.1 Introduction	14
2.2 Third Party Logistics (3PL)	14
2.3 Types of 3PL provider	18
2.4 Brief history of 3PL.....	19
2.4.1 Introductory phase	20
2.4.2 Awareness phase.....	21
2.4.3 Necessity phase	22
2.4.4 Integration phase.....	23
2.4.5 Differentiation phase	23
2.4.6 Incorporation phase	24

2.5	3PL decision making process	25
2.6	Theoretical perspectives on 3PL decision	29
2.6.1	Microeconomic theory in 3PL.....	30
2.6.2	Competitive theory in 3PL	31
2.6.3	Decision theory in 3PL.....	31
2.6.4	Marketing theory in 3PL	32
2.7	Factors driving the 3PL decision	32
2.7.1	External factors.....	33
2.7.2	Internal factors.....	34
2.7.3	Behavioural factors.....	36
2.8	Summary.....	37

CHAPTER 3: A THEORETICAL FRAMEWORK- THE THEORY OF PLANNED BEHAVIOUR

3.1	Introduction.....	40
3.2	Application of behavioural theories	40
3.2.1	The theory of reasoned action	41
3.2.2	The theory of interpersonal behaviour.....	42
3.3.3	The theory of planned behaviour.....	43
3.3	Evolution of TPB research	47
3.3.1	Introductory phase	47
3.3.2	Growth phase.....	49
3.3.3	Maturity phase	50
3.3.4	Elaboration phase	52
3.4	A Theoretical framework for modelling intention to use 3PL.....	54
3.4.1	Predicting intention	56
3.4.2	Behavioural beliefs and attitude toward behaviour	56
3.4.3	Normative beliefs and subjective norms	57
3.4.4	Control beliefs and perceived behavioural control.....	57
3.4.5	Attitude and behavioural intention	58
3.4.6	Subjective norm and behavioural intention.....	58
3.4.7	Perceived behavioural control and behavioural intention	59

3.5	Limitations of TPB	59
3.6	Summary	60

CHPATER 4: RESEARCH METHODOLOGY

4.1	Introduction	63
4.2	Research methodology	63
4.2.1	Study context: logistics environment of Bangladesh	65
4.3	Methodological approach	72
4.4	Sample design	72
4.4.1	Sample frame.....	72
4.4.2	Sampling method.....	72
4.4.3	Sample selection criteria.....	73
4.4.4	Sample size.....	73
4.5	Instrument design	73
4.5.1	Survey questionnaire.....	74
4.5.2	Measuring instruments.....	74
4.5.3	Scaling method.....	75
4.6	Data collection	76
4.6.1	Respondents' profiles.....	77
4.7	Hypotheses	77
4.8	Method: Structural Equation Modelling (SEM)	78
4.8.1	Why structural equation modelling?.....	79
4.8.2	Basic concepts of SEM.....	79
4.8.3	Modelling strategy.....	82
4.8.4	SEM steps.....	82
4.9	Construct validity	89
4.9.1	Convergent validity.....	89
4.9.2	Discriminant validity.....	89
4.9.3	Nomological validity and face validity.....	90
4.10	Multi-group invariance	90
4.10.1	The baseline model.....	90
4.10.2	Configural invariance.....	91

4.10.3	Measurement and structural invariance	91
4.11	Summary	92

CHAPTER 5: SURVEY DATA ANALYSIS

5.1	Introduction	94
5.2	3PL usage in Bangladesh	94
5.2.1	Extent of 3PL usage.....	94
5.2.2	Organisational factors affecting 3PL usage.....	97
5.2.3	Benefits, limitations and impact of 3PL usage	98
5.2.5	Inter-industry differences in 3PL usage and intention to use	100
5.3	Data preparation	102
5.3.1	Missing data.....	102
5.3.2	Coefficient alpha and reliability	102
5.3.3	Assessment of multivariate normality, outlier and multicollinearity	103
5.3.4	Optimal scaling.....	104
5.4	Construct validity.....	106
5.4.1	Convergent validity	107
5.4.2	Discriminant validity	107
5.4.3	Nomological validity	108
5.5	Summary.....	108

CHAPTER 6: MODELLING INTENTION TO USE 3PL

6.1	Introduction	111
6.2	Data analysis	111
6.2.1	Step 1: exploratory factor analysis	112
6.2.2	Step 2: correlations between direct and indirect measures.....	113
6.2.3	Step 3: Confirmatory factor analysis	114
6.2.4	Step 4: Path model.....	126
6.2.5	Step 5: Common method bias.....	132
6.2.6	Step 6: Multi-group invariance.....	133
6.3	Summary	138

CHAPTER 7: DISCUSSION

7.1	Introduction	141
7.2	3PL environment in Bangladesh	141
7.3	Intention to use 3PL	144
7.3.1	Effect of direct constructs on intention.....	145
7.3.2	Effect of indirect constructs on intention	147
7.3.3	Effect of group differences on intention.....	149
7.4	Summary	150

CHAPTER 8: IMPLICATIONS AND CONCLUSION

8.1	Introduction	153
8.2	Key research findings	153
8.2.1	3PL usage in Bangladesh.....	153
8.2.2	Intention to use 3PL services.....	154
8.3	Answering the research questions	154
8.4	Contribution of the study	156
8.5	Strategic implications	157
8.5.1	Current 3PL practices	158
8.5.2	Drivers of 3PL use intention.....	159
8.6	Limitations and further research	160
8.7	Conclusion	161

REFERENCES	163
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APPENDICES

Appendix 1: Measurement scales and constructs of TPB	1900
Appendix 2: Questions related to 3PL environment in Bangladesh	191
Appendix 3: Univariate and multivariate normality	194
Appendix 4: Multicollinearity.....	194
Appendix 5: One -factor congeneric models (Intention, PBC Subjective norms).....	195

Appendix 6: Summary of model parameters	196
Appendix 7: AMOS output for measurement model: parameter estimates	196
Appendix 8: Total variance explained	197
Appendix 9: CFA Measurement model (using a common latent factor- CLF)	198
Appendix 10: Difference of regression weights of CFA with and without CLF	198
Appendix 11: CFA structural model (using a common latent factor- CLF)	199
Appendix 12: A Comparison of country specific 3PL studies.....	200

LISTS OF FIGURES

Figure 1.1: Research framework	10
Figure 2.1: Key aspects of the 3PL concept	15
Figure 2.2: Dyadic relationships.....	17
Figure 2.3: Triadic relationships.....	17
Figure 2.4: Classification of 3PL providers	19
Figure 2.5: Historical timeline of the 3PL industry.....	20
Figure 2.6: Layers of logistic service providers	21
Figure 2.7: 3PL decision making model.....	25
Figure 2.8: 3PL decision-making research	27
Figure 2.9: Theoretical categories in 3PL and SCM	30
Figure 2.10: Factors driving 3PL decision-making.....	33
Figure 2.11: Different aspects of 3PL research content	36
Figure 3.1: Theory of reasoned action.....	42
Figure 3.2: Theory of interpersonal behaviour	42
Figure 3.3: Theory of planned behaviour	43
Figure 3.4: Evolution of TPB research	48
Figure 3.5: The reasoned action approach.....	54
Figure 3.6: Theoretical framework of modelling intention to use 3PL.....	56
Figure 4.1: Flow chart of research methodology.....	64
Figure 4.2: Map of Bangladesh with major transportation networks	65
Figure 4.3: Major local and international railway and waterways network	68
Figure 4.4 Domestic and international route map of Biman Bangladesh Airlines.....	69
Figure 4.5: Classification of respondents by industry	77
Figure 4.6: Modelling the intention to use 3PL.....	78
Figure 5.1: Frequently used 3PL functions	95
Figure 5.2: Most frequently used 3PL functions, by manufacturing and service industries	96
Figure 5.3: Most cited benefits of 3PL usage	99
Figure 5.4: Most cited limitations of 3PL usage	99

Figure 5.5: The impact of 3PL usage	100
Figure 5.6: Steps in constructing optimal scaling for indirect measures.....	106
Figure 6.1: Data analysis process	112
Figure 6.2: One-factor congeneric measurement model (attitude).....	115
Figure 6.3: Multi-factor measurement model.....	115
Figure 6.4: Multi-factor measurement model (with standardised estimates)	119
Figure 6.5: Modified multi-factor measurement model	123
Figure 6.6: Structural model.....	125
Figure 6.7: Initial path model	128
Figure 6.8: Modified path model.....	130
Figure 6.9: Baseline model with equality constraints specified for all factor loadings, covariances and error covariances	137

LISTS OF TABLES

Table 2.1: The six phases of 3PL evolution	20
Table 2.2: Key studies on 3PL decision-making process	28
Table 2.3: Critical success factors of outsourcing	35
Table 3.1: Major journals in different disciplines that publish TPB-related research.....	45
Table 3.2: A list of external variables used in TPB.....	51
Table 4.1: Direction of export from Bangladesh by regions	70
Table 4.2: Classification of goodness-of-fit indices	87
Table 5.1: Cross tabulation of level of commitment and allocated budget to 3PL use	97
Table 5.2: Cross tabulation of length of 3PL use and level of commitment	97
Table 5.3: Organisational factors affecting 3PL usage.....	98
Table 5.4: Cross tabulation of 3PL usage and type of industry.....	100
Table 5.5: Sample t-test (type of industry)	101
Table 5.6: Cross tabulation of 3PL usage and size of organisations	101
Table 5.7: Sample t-test (size of organisations)	102
Table 5.8: Hierarchical linear regression (comparisons of additive and multiplicative models)	105
Table 5.9: Measures' correlations (square), Cronbach's alpha, AVE and construct reliability	108
Table 6.1: Rotated factor loadings.....	113
Table 6.2: Correlation between direct and indirect measures	114
Table 6.3: Summary of model variables.....	116
Table 6.4: Goodness-of-fit statistics for four one-factor congeneric models	118
Table 6.5: Summary of goodness-of-fit statistics of multi-factor measurement models.....	124
Table 6.6: Structural parameter estimates of intention to use 3PL model.....	131
Table 6.7: Comparison of structural models with and without CLF	133
Table 6.8: GOF statistics for multi-group invariance: a summary (CFA).....	136
Table 6.9: GOF statistics for multigroup invariance: a summary (path model).....	138

ACRONYMS

AVE	Average Variance Extracted
AMOS	Analysis of Moment Structures
BBS	Behavioural Belief Strength
CFI	Comparative Fit Index
CFA	Confirmatory Factor Analysis
CMB	Common Method Bias
CLF	Common Latent Factor
CBS	Control Belief Strength
CBP	Control Belief Power
EFA	Exploratory Factor Analysis
FBCCI	Federation of Bangladesh Chambers of Commerce and Industry
1PL	First Party Logistics
4PL	Fourth Party Logistics
GOF	Goodness-of-fit
GFI	Goodness-of-fit index
ML	Maximum Likelihood
MC	Motivation to Comply
MI	Modification Index
NBS	Normative Belief Strength
NFI	Normed Fit Index
OE	Outcome of Evaluations
PBC	Perceived Behavioural Control
PCA	Principal Component Analysis
PAF	Principal Axis Factoring
RMSEA	Root Mean Square Error of Approximation
RMR	Root Mean Square Residual
2PL	Second Party Logistics
SCM	Supply Chain Management
SEM	Structural Equation Modelling
SAARC	South Asian Association for Regional Cooperation
SPSS	Statistical Package for the Social Sciences
SRMR	Standardised Root Mean Residual

SME	Small and Medium-sized Enterprise
3PL	Third Party Logistics
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behaviour
TIB	Theory of Interpersonal Behaviour
TAM	Technology Acceptance Model
UNCTAD	United Nations Conference on Trade and Development

ABSTRACT

The globalisation of business and the consequent development of competitive global production networks have increased the dependence on Third Party Logistics (3PL). A 3PL is an external provider who manages, controls, and delivers outsourced activities and provides both standardised and customised services for both short-term and long-term mutually beneficial relationship between a service provider and user transactions. Outsourcing of services to 3PL enables organisations to achieve an optimal balance between responsiveness and efficiency. However, the decision to use 3PL is a complex process as it entails different factors impacting on both pre and post decision making stages. Most 3PL decision making literature considers analysing both internal (e.g. organisational size, structure and strategy) and external (e.g. economic trends, regulatory framework, technological developments) factors. The outsourcing decision is not always driven by cost saving or customer responsiveness: it is also subject to individual perceptions, attitudes and beliefs. The impact of behavioural factors has however attracted little research attention. Unless it is understood what extent the decision to use 3PL is driven by behavioural factors, it would be difficult to know how best to improve 3PL decision making to be competitive in global markets.

The impact of behavioural factors in the business customers' decision to outsource a service to a 3PL provider is the subject of this thesis. To that end, this research identifies and empirically tests the factors that influence the business customers' intention to use 3PL. Applying the theory of planned behaviour as the theoretical foundation for modeling business customers' intention, it investigates how attitude, subjective norm and perceived behavioural control predict the intention to use 3PL, and whether such intention is translated into actual 3PL use or not. The behavioural model is built in the context of Bangladesh; 243 business organisations are at its core.

A quantitative approach is adopted to understand business customers' intentions to use 3PL services in the context of Bangladesh. The intention to use 3PL is measured by the three direct constructs (attitude, subjective norm and perceived behavioural control) and the three indirect constructs (behavioural, normative and control belief). In addition, to analyse the context of 3PL use, questions relating to the extent of current 3PL usage, the key functions outsourced to 3PL and the benefits of outsourcing are also investigated. A structural equation modelling

(SEM) is applied to establish the relationships between behavioural factors and the intention to use 3PL.

The results related to the 3PL context in Bangladesh, indicate that 63 per cent of the organisations currently use 3PL services. Freight forwarding and order fulfilment are the services often outsourced to 3PL providers. Reductions in costs, access to remote markets and faster delivery are cited as the key benefits of outsourcing, while the leakage of competitive information is identified as a major concern. The decision to use 3PL is mostly taken at the corporate level, although managers from other departments such as marketing, human resources and production are important influencers of 3PL decisions.

The SEM results show that the intention of 3PL use is driven by attitude, subjective norm and perceived behavioural control. This implies that business customers who exhibit positive attitude tend to favour 3PL use. The perceptions of social pressure, exerted from operating in a competitive environment, and of the capacity and control to make decisions, are indicative of a positive response to outsource services to 3PL providers. Subjective norm is the strongest predictor of the intention to use 3PL, suggesting that respondents are more likely to use 3PL when they are under social pressure of a competitive environment. The intention is also driven indirectly by behavioural beliefs and normative beliefs that directly impact on attitudes and subjective norm, which in turn positively influence the intention to use 3PL. The model is extended to test whether these relationships hold for both 3PL users and non-users. A multi-group invariance test was carried out which shows that the differences between these two groups have no statistically significant effect on the structural relationships between attitudes, subjective norm, or perceived behavioural control and intention. In other words, there is no difference in intention between 3PL users and non-users.

The theory of planned behaviour is applied, for the first time, in the field of 3PL research in the context of Bangladesh. The model explains the intention to use 3PL services and its association with behavioural, normative and control beliefs. The findings in relation to modeling intention to use 3PL provide an evidence base for organisations who value the benefits of 3PL outsourcing to create an inclusive and collaborative working environment. Such organisations should deploy strategies to promote positive attitudes, minimise the negative impact of decision making under perceived social pressure, and empower managers

with autonomy and capacity to improve their decision making. This may strengthen managers self-confidence and beliefs to make evidence-based decisions that lead to stronger self-motivation, greater accountability and an enhanced sense of empowerment, that act to improve 3PL decision making.

The results also show the extent of 3PL use and practices, which would enable decision makers to benchmark their organisation's use of 3PL against other organisations. Industries and organisations vary in their use of these services, in their intention to use them, and in their attitude towards them, which suggests that outsourcing is an effective but not the only strategy adopted by organisations to deal with the increased complexities of global production networks. To promote greater use of outsourcing services in Bangladesh, it is important to streamline existing 3PL services, their use and decision making processes so that the resulting improved 3PL environment can play a key role in strengthening Bangladesh's efforts to maintain strong growth in logistics industries that are compatible with standards of global outsourcing practices.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The significance of third party logistics to global economy is growing rapidly. Global 3PL revenue, for example, has increased to US\$703 billion worldwide (Langley and Capgemini, 2015). There has been a widespread use of 3PL as a strategic tool to reduce costs, improve efficiency and responsiveness, and expand the geographic extent of businesses. The rapid growth of 3PL business has largely been driven by globalisation and the resulting increase in complexity of global supply chain networks (Chopra and Meindl, 2010). The spatial fragmentation of globalised production networks has forced organisations to enter into strategic partnerships with 3PL providers to improve their levels of service, increase flexibility and customise services to specific customers' demand, and to help them to increase market coverage (Bowersox, 1990, Lieb, 1992, Sink et al., 1996). Many organisations consider gaining strategic advantages by outsourcing logistics functions that were previously performed 'in-house' (Bowersox, 1990, Bagchi and Virum, 1998, Anderson et al., 1994, LaLonde and Cooper, 1989).

The decision to use 3PL is complex, long-term and continuous, which requires strategic alignment with suppliers to manage the complexity of supply chains (Bennet and Bennet, 2008). The adoption of 3PL is a strategic decision, not merely a tactical, for organisations aiming to reduce logistics costs, lead time and work burden (Bask, 2001). There is an extant literature that identified the factors, influencers and processes driving the outsourcing decisions. For example, the studies by Bask (2001), Hertz and Alfredsson (2003), Langley et al. (2005), and Sheffi (1990) investigate the impact of inter- and intra-organisational factors (such as organisational size, structure and strategy) and the external environment (such as economic trends, regulatory frameworks, and technological developments), on 3PL decision process. Whilst other studies examined the variegated impact of different stages of a 3PL relationship building (such as build-up, execution and institutionalisation) on decision making (Marasco, 2008). Motives for considering 3PL use, the evaluation and selection of 3PL providers, and relationship between client and provider, have all received due attention in the extant literature. However, research investigating the behavioural aspects of 3PL decision making is rather limited. Most of the previous studies have largely pursued the economic rationalism aiming to achieve cost advantages, flexibility and responsiveness through the adoption of 3PL. Outsourcing a business function to a 3PL provider is therefore often founded on cost reduction strategies. This rationalist approach to 3PL decision making is based on a

cost–benefit analysis, a multi-step process moving from problem identification to solution, to reach a logical, sound decision. As well as these, the selection and evaluation processes that lead to a decision to use 3PL are also affected by the decision makers' perceptions, attitudes and beliefs about 3PL services. So far the importance and role of these behavioural factors have attracted less research attention. This research addresses this gap by examining the behavioural aspects of 3PL decision process.

Organisations choose to carry out a business function in-house or outsource it to a 3PL is often systematically assessed on the certainty of outcomes and trade-offs between efficiency and responsiveness. However, the decision process even in a highly objective, systematic and rational way is often influenced by individuals' thought processes (Nilsson and Dalkmann, 2001). Regardless of the validity of the economic rationalism as an approach to organisational decision-making, 3PL decisions, after all, are made by individuals, who are often subject to personal biases, predilections and prejudices. People tend to form a mental representation of the decision problem, which consists of three key aspects: the context of the decision (e.g., the business environment), information about the decision (e.g. its benefits and limitations) and individual differences (Soman (2004). Individuals therefore could make different decisions as they perceive, cognise and interpret same information differently. This means that the decisions or choices made on a particular business problem could vary between individuals and across different contexts (Huitt, 1992). Unless it is understood why business customers opt to outsource services and what extent the decision to use 3PL is driven by behavioural factors, it would be difficult to know how best to improve 3PL decision making process to remain competitive in global markets. This posits hurdles in making evidence based informed business decisions to help organisations foster organisational culture compatible with standards of global outsourcing practices. A behavioural approach to 3PL decision making is therefore required to develop a better understanding of decision makers' attitudes toward outsourcing, the perceived social pressures within which they operate, and the perceived control, the autonomy and authority, they have when they take the decision to outsource.

The theory of planned behaviour (TPB) has been one of the most influential and well-supported theory for predicting human behaviour (Ogden, 2003, Sutton, 1998). According to TPB, behavioural decisions are the results of attitude, subjective norms and perceived behavioural control which influence behaviour primarily through their impact on intention.

This thesis builds on the theory of planned behaviour (Ajzen, 1991) to explain the intention of business customers to use third party logistics services in Bangladesh. In particular, the impacts of behavioural factors on the 3PL decision-making process are examined.

This chapter is structured in three sections. The research aim and objectives are first presented, and followed by outlining the research rationale in section two. Section three discusses the research methodology with particular emphasis on the context of the study and the proposed methodological framework. A brief discussion of the overall thesis structure is also provided.

1.2 AIM AND QUESTION

The thesis assesses the impact of behavioural factors that influence business customers' intention to use 3PL services and identify the differences in intention between users and non-users of 3PL services. To achieve the aim, four research questions are set out:

- What are the key characteristics of 3PL practices and the 3PL decision-making environment in Bangladesh?
- Do attitudes, subjective norms and perceived behavioural control predict the intention of business customers to use 3PL services?
- Does the intention to use 3PL services translate into actual 3PL use?
- Does the intention to use 3PL vary between users and non-users?

1.3 RATIONALE OF THE RESEARCH

Third-party logistics as an industry has experienced an unprecedented growth in international business (Langley, 2012). Armstrong & Associates (2015) noted this continuous growth in global revenue for the industry at US\$ 616.1 billion from 2010 to 2011, US\$ 685.1 billion from 2011 to 2012 and US\$ 703.8 billion from 2012 to 2013. The widespread use of 3PL as a strategic tool is widely acclaimed to help organisations to reduce operational costs, infrastructural capital investment and inventory costs through well-managed inventory and integrated supply chain solutions. The 2014 annual study of 3PL reported that business customers continue to gain positive results from 3PL use. They report an average logistics cost reduction of 11 per cent, an average inventory cost reduction of 6 per cent, and an average fixed logistics cost reduction of 23 per cent (Langley, 2014). The performance during the recent global economic crisis showed that the 3PL industry is resilient and robust to short-

and long-term perturbations, coping well with business volatility. With growing access to world-class resources, processes, services, and technologies; and with accumulating expertise and economies of scale in providing outsourcing, 3PL providers are sufficiently agile and flexible to accommodate future business needs and challenges (Langley, 2012).

The scope and functions of 3PL have also evolved over time. In an analysis of 18 years of 3PL data, Langley and Capgemini (2015) note an increased use of outsourced logistics services; however, now the scope has started to shift from fragmented service to more integrated and consolidated service model. Their study, for example, reports that 56 per cent of 3PL user organisations are involved in horizontal integration as well as requiring integrated services from a number of 3PL providers to achieve more cohesive production planning and scheduling (Langley and Capgemini, 2014). The trend is toward fewer, larger 3PL players. The new strategy of ‘consolidated outsourcing’ requires vertical and horizontal integration of 3PL services through merger and acquisition. For example, Echo Global Logistics, a Chicago-based third party transportation service, acquired one of their competitors, Command Transportation, to build technology-enabled and multimodal transportation services. In 2014, Echo and Command had a combined revenue of US\$1,734 million, and drew on a network of more than 26,000 transportation providers (ECHO, 2015). It is evident that the horizontal and vertical integration of organisations provides benefits such as logistics cost savings and service improvements; however, it also poses two key challenges for both providers and users. First is the intricacy of managing multiple 3PL services for the wide variety of business customers; and second is the increased complexity 3PL decision making process, arising due to amalgamation of often incompatible organisational cultures. A company could be acquired or merged typically in response to product or market synergies, but it necessitates integrating the embedded cultural differences across organisations (Pikula, 1999). It is realistic that decision making in a merged or acquired organisation will be dominated by the organisation with the greatest equity.

The decision to outsource and the consequent implementation are also partly influenced by both the organisations’ shared culture and individual employees’ perceptions and behaviours, including their attitudes, beliefs, personalities, prejudice and biases. Some studies have noted the negative impacts of 3PL use on employees’ morale, and increased redundancy. For example, in a study of 3PL use, 19 per cent of respondents from large American organisations

considered the negative impact of 3PL use on employee morale (Lieb, 1992). According to Cooke (1988) and Muller (1991), the decision to use outside organisations for certain services may foster a fear among existing employees of being made redundant. In a study of buyer observations of the US third party logistics market, customers' non-acceptance of and impaired credibility regarding 3PL services were found to be its two most commonly cited disadvantages (Sink et al., 1996). All of these indicate stakeholders' negative perceptions toward the use of 3PL services. Hence, any company's decision to offer 3PL services without knowledge of their intended business customers' attitudes and intentions may undermine the key purpose of outsourcing. Insufficient understanding of individual differences and the extent of cultural incompatibility of the two organisations could raise labour issues such as conflicts between employees, job stress and job dissatisfaction, and lead to higher employee turnover (Susan and Cooper, 1993). This consolidation trend requires attention to 3PL from the perspective of soft aspects (i.e. behavioural issues) that are expected to develop with the growing trend toward amalgamation of organisations.

Behavioural aspects of decision making, especially beliefs, perceptions, and value judgments, are of significant relevance but often neglected, in logistics and supply chain research (Bazerman and Terrell, 2006). The insights from behavioural research may provide a comprehensive knowledge base to assess outsourcing service providers' behaviour response. Decision makers' attitudes, the social pressure, and the perceived autonomy and control in taking decisions are critically important to the successful adoption of outsourcing as a strategic tool. In particular, it could provide knowledge on how logistic managers or supply chain analysts identify outsourcing needs, analyse, interpret and evaluate outsourcing alternatives, and respond to a given outsourcing decision (Tokar, 2010). Behavioural research has received considerable attention in other disciplines such as economics, management, marketing, finance and, of course, psychology; but not much progress being made in incorporating behavioural aspects in the assessment and selection of integrated logistics systems and processes (Camerer and Lowenstein, 2003).

The above discussion has identified three key reasons that justify the adoption of a behavioural approach to 3PL decision making, based on the need that such research would offer new insights to help develop more informed and integrated logistics and supply chain systems to improve the understanding of 3PL usage patterns and decision making process.

- Third party logistics services are expected to grow rapidly so is the need to continually enhanced the capability of organisations to create value for their customers. In addition, the emergence of a matured 3PL industry has led to the development of a more integrated and consolidated service network, which in turn requires further improvement in the understanding of behavioural issues that are expected to arise in the course of consolidation and/or collaboration stage (Langley and Capgemini, 2015).
- Third party logistics research has developed a comprehensive knowledge base to explain how organisations optimise service delivery by outsourcing parts of the supply chain to 3PL service providers (CSCMP, 2008); what inter- and intra-organisational factors affect outsourcing decision-making processes; and how these are shaped by broad environmental dynamics. However, the behaviours of decision-makers, which have significant impact on the decision to outsource and on the implementation of the outsourcing process, are now needed to be better understood.
- An analysis of behavioural aspects of 3PL decision making can enhance the understanding of the psychological barriers and opportunities of 3PL use. Modelling factors such as attitudes toward 3PL, perceived social pressure to use 3PL and the perceived control when taking decisions regarding 3PL would increase the effectiveness and efficiency of 3PL decision making. Incorporation of these behavioural aspects of decision making within a modelling framework can increase the robustness, predictive accuracy and practical usefulness of the process (Bazerman and Terrell, 2006).

1.4 RESEARCH METHODOLOGY

The research methodology includes a description of the study context, a methodological framework and thesis structure.

1.4.1 Study context: Bangladesh

Bangladesh, one of the developing countries of South Asia, has been selected as the context of this study. Dhaka, the capital city, and Chittagong, the port city, are the two most populous cities of Bangladesh. They are the key logistics hubs and the origin of significant third party logistics activities in the country. The logistics activities of Bangladesh are based on its export industry, which is not as strong as in other developing countries such as China, Hong Kong and India. The garments sector is one such export oriented industry which accounts for more

than three-fourths of all exports (EPB, 2010). The Bangladesh government has developed trade policies to attract foreign investment, such as highly liberal and proactive foreign investment opportunities, three to five years' tax exemption. in specific industries, sustainable high cost-competitiveness in service sectors, and duty-free import of capital machinery (Akter, 2012). The transport, storage and communication sector accounted for 10.80 per cent of GDP in 2012–2013, and growth for this sector has shown an increase in the last five financial years (BBS, 2011). These have broadened the scope of outsourcing in Bangladesh.

There are two major reasons for selecting Bangladesh as a study context:

- *To improve the understanding of 3PL practices.* There is no comprehensive research on 3PL practices that enables a comparison the 3PL environment in Bangladesh with world market practices (Razzaque, 1997). There has been substantial amount of research that provide comprehensive understanding of 3PL usage from the perspectives of both developed countries such as United States (Lieb, 1992), Australia (Dapiran et al., 1996); (Rahman, 2011); UK (Fernie, 1999); (Jaafar and Rafiq, 2005) and the developing countries such as China (Hong et al., 2004), India (Sahay and Mohan, 2006), Ghana (Sohail et al., 2004), Saudi Arabia (Sohail and Al-Abadil, 2005) and Malaysia (Sohail and Sohal, 2003). However, the inadequate information regarding existing logistics services in Bangladesh limits the decision making capabilities of global logistics buyers. There is also a lack of information by which to compare the standards and performance of logistics services of Bangladesh with similar countries such as India and Pakistan who also compete in the global outsourcing market on low labour costs.

Bangladesh is experiencing an unprecedented growth in the garment sector. It has established itself as the textile and readymade garment powerhouse of the world, with almost all major global apparel brands outsourcing garment companies housed within the country. Despite this strong export-oriented industrial base, low labour costs and favourable government policies to attract foreign direct investment, logistics costs are still prohibitive and the logistics infrastructure and services to support seamless supply chains are poorly planned, built and maintained. Furthermore, little has been done to understand the 3PL environment in Bangladesh and its impact on the ability of the local logistics business to support an efficient and effective outsourcing future

(Razzaque, 1997). It is therefore important to understand current usage in the context of global logistics outsourcing, which is the first step to promoting effective 3PL usage in Bangladesh.

- *To identify the behavioural factors driving the 3PL decision making process.* Domestic 3PL practices in Bangladesh are largely shaped by the nation's presence in the global outsourcing market. Bangladesh's competitiveness in the global outsourcing market for its cost effectiveness over China, India, Vietnam and Philippines (Narayanan, 2013) has been consistent for several years, notwithstanding tragedies such as the Rana Plaza factory collapse in 2013. The use of 3PL is becoming an accepted way of doing business in Bangladesh. The use 3PL services by many multinational and transnational companies is commonplace and many perceive the multiple benefits yet the use of 3PL is not yet widely prevalent. There are several questions which arise from this paradoxical state such as: why are firms not adopting 3PL services while acknowledging their advantages? What factors drive the 3PL decision-making process? What aspects contribute to the decision makers' intentions, beliefs and attitudes to using 3PL? Responding to these questions requires an understanding of the business customers' decision-making processes when considering the use of 3PL services.

1.4.2 Research framework

This research is designed in three broad stages: i) theoretical, ii) modelling and iii) strategic implications (Figure 1.1). The theoretical stage investigates the literature related to 3PL and behavioural theories with particular emphasis on the theory of planned behaviour. Discussion of 3PL concepts, factors influencing 3PL decision making, and theories used in 3PL research will be carry out to establish the research hypotheses and the subsequent modelling of the intention to use 3PL. Overall, the theoretical stage focuses on the literature review related to 3PL and the theory of planned behaviour with the aim of developing a theoretical framework of modelling intention to use 3PL in the context of Bangladesh.

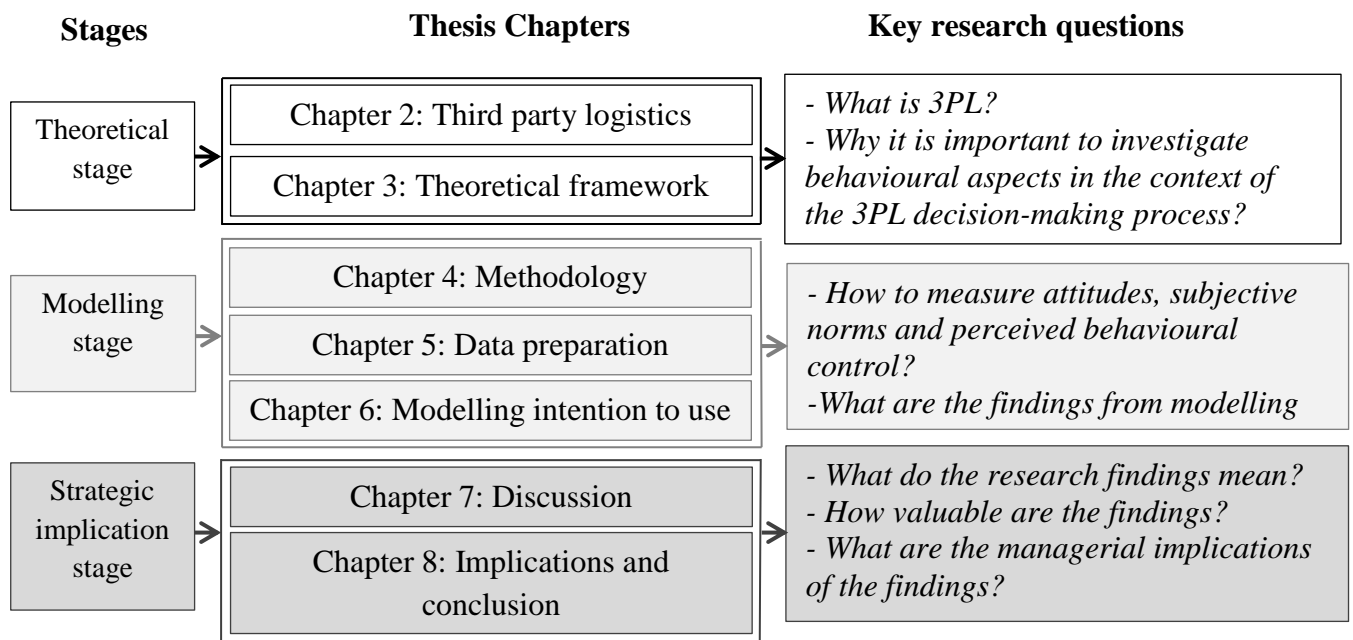


Figure 1.1: Research framework

The modelling stage develops the methodological framework and establishes the hypotheses for statistical model. A quantitative approach to data analysis is adopted for this purpose. Specifically, it employs descriptive statistical techniques to examine the current 3PL usage and decision-making environment in Bangladesh. Structural equation modelling is then used to test the model fit and hypotheses. The hypothetical relationships are also taken into consideration in conducting a multi-group invariance test to understand the impact of group differences on the intention to use 3PL services in Bangladesh. Overall, the modelling stage centres on how to analysis the data, the pre-requisites for conducting structural equation modelling, and what might be the results of data analysis.

The strategic implications stage synthesises the research results in relation to the overarching aim of the research. Discussion of the research findings develops by linking it to theoretical underpinnings and prior 3PL studies. Current 3PL usage in Bangladesh is compared with other countries' 3PL practices. The results related to 'modelling intention to use 3PL' compare and contrast the findings with prior TPB research. This discussion lays the foundations for presenting the significant theoretical and managerial contributions of this research. Overall, the discussion and implication stages focus on explaining what the research findings mean, how valuable they are, and why they are valuable.

1.4.3 Thesis structure

This thesis is organised into eight chapters, each of them specifically designed to address the research questions. This chapter introduced the topic, set out the aim and research questions, highlighted the rationale for the research and outlined the methodological framework.

Chapter 2 involves an extensive analysis and synthesis of extant literature central to this research topic: third party logistics. It includes a discussion of the conceptualisation of 3PL, an historical evolution and consideration of factors influencing 3PL decisions. It also draws on the theoretical underpinnings of 3PL literature. Overall, this chapter defines the concept of 3PL wherein a discussion on the meaning and scope of relevant research is presented, and a gap in the knowledge is identified.

Chapter 3 develops a theoretical framework for this research guided by the theory of planned behaviour. It begins by outlining the widespread applications of TPB and presents a rationale of the use of TPB as a theoretical framework. A discussion of the historical evolution of TPB is presented, followed by a description of the behavioural modelling framework and its constructs in the context of 3PL. This chapter establishes the theoretical foundation which will guide the modelling framework to examine the intention to use 3PL in Bangladesh.

Chapter 4 details study methodology. It begins with a description of the study area, its existing logistics services, infrastructure, challenges and opportunities. A description of the research design and justification for the choice of the methods is provided. Study participants, instruments used to assess constructs, data collection procedures, and reliability and validity measures are introduced. Procedural tests of hypothesised relationships using structural equation modelling (SEM) technique are included. The methods and statistical techniques used in testing the modelling framework are also explained in this chapter.

Data preparation and instrument validation is performed in Chapter 5. This chapter focuses on answering the first research question, and therefore includes a discussion of descriptive statistics of 3PL usage in Bangladesh. It also includes the results related to measurement validation and statistical assumptions that are required to use structural equation modelling. This chapter prepares the data and instruments for further statistical analysis in Chapter 6.

Chapter 6 presents the results of the data analysis in relation to the intention to use 3PL by business customers in Bangladesh. It includes the findings related to correlation analysis and CFA analysis as well as multi-group invariance test conducted between 3PL users and non-users. This chapter answers the second, third and fourth research questions by presenting the results of SEM.

Chapter 7 discusses the findings in conjunction with the research questions. The discussion is based on the analysis and the results related to current 3PL practices in Bangladesh, and to the applicability of the theory of planned behaviour in the context of 3PL. Overall, this chapter discusses current 3PL usage with a comparison of global 3PL practices and the factors that characterise the intention to use 3PL by business customers in Bangladesh.

Chapter 8 summarises the key findings and discusses the scope of this research. The research questions set out earlier are revisited to evaluate whether they are adequately answered. The chapter identifies the theoretical contributions of this thesis and the practical implications that arise from the research. Future research, along with key limitations, is also discussed.

1.5 SUMMARY

This chapter has established the research background within which this research on intention to use 3PL is carried out. It has provided the rationale for undertaking this research by highlighting the importance of behavioural research and identifying existing gaps in the literature on behavioural aspects of 3PL decision-making in the context of Bangladesh. This chapter has presented the research aim and set out four interrelated research questions. The three-stage process designed to implement this research, the theoretical, modelling, and strategic implication stages, were set out. The chapter concluded with a brief outline of the thesis structure.

The next chapter introduces the concept of 3PL and the scope of 3PL literature with particular emphasis on 3PL decision-making research.

CHAPTER 2

THIRD PARTY LOGISTICS – CONCEPT, DEVELOPMENT AND THEORY

2.1 INTRODUCTION

This chapter defines the concept of third party logistics (3PL), examines the decision-making processes involved in outsourcing, and identifies a gap in 3PL decision-making research. It begins with a presentation of various definitions of 3PL and types of service providers, followed by a historical evolution of the concept, and the key elements of 3PL decision making that point to a need for investigation of behavioural aspects of the decision-making process. It also identifies the main theoretical perspectives of 3PL research and the key factors that underpin decision making. This chapter concludes with a summary of the key prior research findings.

Specifically, this chapter addresses the following questions:

- What is 3PL and how has it evolved over time?
- What are the key elements of 3PL decision-making processes?
- What are the theories that underpin 3PL research?
- What are the factors that drive the 3PL decision-making process?

2.2 THIRD PARTY LOGISTICS (3PL)

The terms ‘third-party logistics’ and ‘outsourcing’ generally mean the same thing (Lieb et al., 1993). Commonly used concepts such as ‘logistics alliances’ (Bowersox, 1990), ‘operational alliances’ (Laarhoven and Graham, 1994), ‘contract logistics’ (Kearney, 1995) and ‘contract distribution’ (Wilson and Fathers, 1989) are similar to 3PL (Lieb and Randall, 1999). 3PL generally refers to ‘the use of external companies to perform logistics functions that have traditionally been performed within an organization. The functions performed by the third party can encompass the entire logistics process or selected activities within that process’ (Lieb, 1992, p.30). According to this definition, a company that decides to hire an external warehouse instead of building its own is an example of the use of 3PL services. ‘3PL’ thus refers to any external company that manages all or a significant part of another organisation’s outsourcing requirements such as transportation, warehousing, cross-docking, inventory management, packaging, and freight forwarding.

Murphy and Poist (1998, p.27) define third party logistics as ‘a relationship between a shipper and third party which compared with basic services, has more customised offerings, encompasses a broader number of service functions and is characterised by a longer-term, more mutually beneficial relationship’. This implies that business relationships, integrated

services and length of contract are also key aspects of 3PL. Papadoppulo (2001, p. 5) adds an ownership dimension: ‘third party logistics providers are independent companies providing single or multiple logistics services to a purchasing company. Third party logistics providers, although they do not hold ownership of the product for distribution, are legally bound and responsible to perform the requested logistic activities of the purchasing company. The relationship between the two parties is long-term and beneficial’.

Definitions of 3PL are not consistent across disciplines (Skjoett-Larsen, 2000, Van-Laarhoven et al., 2000) and can be conceptualised from different perspectives such as its functions, client-3PL provider relationships, and country context (Figure 2.1).

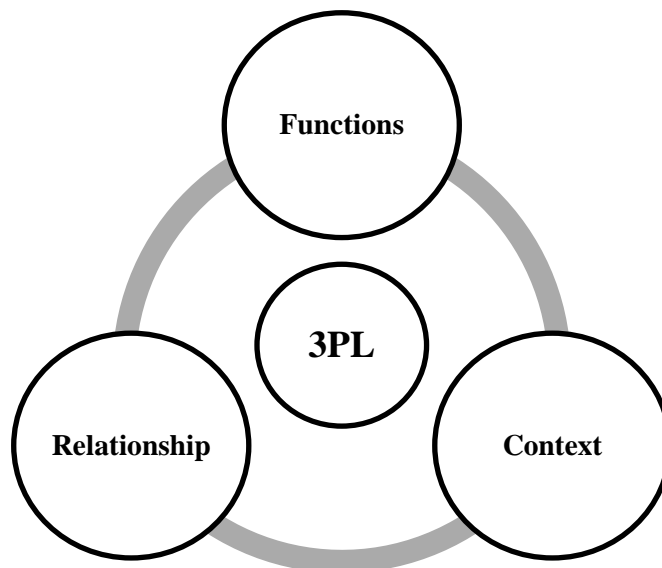


Figure 2.1: Key aspects of the 3PL concept

3PL functions and services shape the concept of 3PL. Knemeyer and Murphy (2005) describe 3PL functions as a spectrum that embraces the arm’s length transactions at one end and the entire logistics process at the other. Bowersox et al. (1995) also define it as a spectrum: the relationship between buyer and seller of logistics services on a continuous scale, ranging from a single transaction to integrated service agreements. The initial use of 3PL services was narrow in scope and limited to one or two types of service, such as warehousing, transportation or material handling. However, due to the increasing need to develop sustainable competitive advantage, the growing emphasis on providing more effective and efficient customer services, and the strategic value of focusing on core businesses (Hill, 1994,

Sheffi, 1990), 3PL providers are increasingly being used for different value-added activities. These include quality control (Fawcett et al., 1993), logistic information systems, shipment consolidation, rate negotiations and product returns (Lieb and Randall, 1999). For example, a top 3PL company such as Ryder System, which initially provided only transportation services, now provides more integrated and customised logistics services. These services include safety and compliance, fuel distribution, packaging, cross-docking, reverse logistics and preventive fleet maintenance. This indicates that the concept of 3PL, first defined on the basis of one or two types of service (such as warehousing and transportation or material handling), now has broadened in scope to more complex and integrated service offerings.

A client–3PL provider relationship is another basis on which 3PL is conceptualised. Figures 2.2 and 2.3 portray the dyadic and triadic relationships between involved parties in outsourcing. When 3PL involves two parties (either seller and logistics service provider [LSP] or buyer and LSP) it is referred to as a dyadic relationship. On the other hand, when 3PL involves three parties (buyer, seller and LSP) it is referred to as a triadic relationship. For example, Bask (2001) considers 3PL a triad linking buyer, seller and logistics service provider; although most of the literature considers the 3PL relationship from a dyadic point of view (Berglund, 2000).

Contextual differences exist in the conceptualisation of 3PL. The Scandinavian definition of 3PL is more extensive than the American definition (Skjoett-Larsen, 2000). From interviews with a number of north European 3PL providers, Bagchi and Virum (1996 p. 95) define 3PL as ‘a logistics alliance indicates a close and long-term relationship between a customer and a provider encompassing the delivery of a wide array of logistics needs. In a logistics alliance, the parties ideally consider each other as partners. They collaborate in understanding and defining the customer’s logistics needs. Both partners participate in designing and developing logistics solutions and measuring performance. The goal of the relationship is to develop a win-win arrangement’. This definition adds new dimensions to the concept of 3PL, such as relationships, collaboration, customised service offerings and mutual benefits and risks; these are not emphasised in the definition by Lieb (1992) in the US context. The north European definition places more emphasis on strategic dimensions, broadening the scope of the concept.

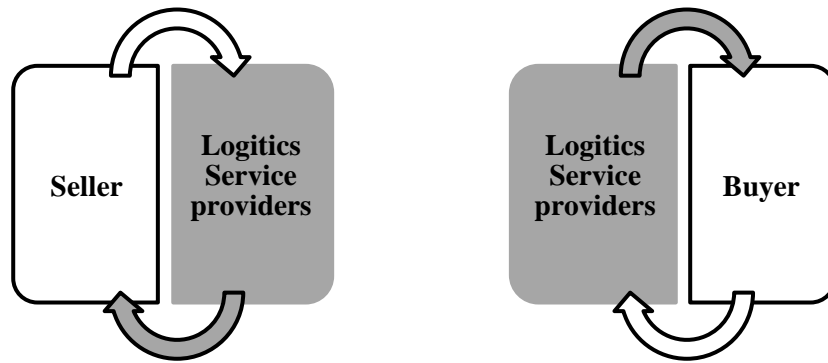


Figure 2.2: Dyadic relationships

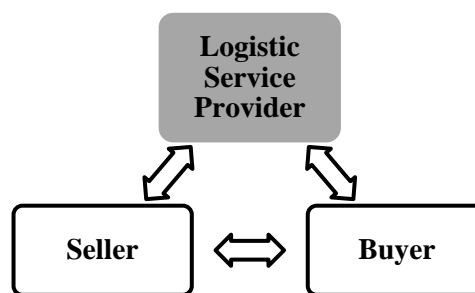


Figure 2.3: Triadic relationships

The 3PL concept, then, is most often developed by users, researchers or consultants on the basis of the business needs and the services offered by a third party. While there is no complete agreement, some characteristics, are common to all:

- 3PL is an external provider who manages, controls, and delivers outsourcing activities.
- It offers a mutually beneficial relationship between provider and user for both short-term and long-term transactions.
- Services offerings range from single to integrated, for both standardised and customised services.

This thesis is based on the premise that outsourcing is the key purpose and *raison d'être* of 3PL, and that a 3PL provider is an external organisation that works as intermediary between buyer and seller.

2.3 TYPES OF 3PL PROVIDER

Over time 3PL providers have been classified differently in the literature. Muller (1993) proposes four types of vendor to define 3PL functions and responsibilities: asset-based, management-based, administrative-based, and integrated. Asset-based vendors invest to build their own assets such as a truck fleet or warehouse facility, and offer dedicated services to clients. Management-based vendors do not invest in such assets but offer services to clients through subcontracting. According to Muller (1993), an integrated vendor is a combination of both asset-based and management-based vendors. Integrated vendors may own a few assets, for example a truck fleet, but do not limit their services to these only. They subcontract other assets, such as IT services, from another party to meet diverse customer needs. Administrative-based vendor mainly offer services related to administration, such as freight payment and administrative planning (Razzaque and Sheng, 1998).

Hertz and Alfredsson (2003) describe four different categories of 3PL providers: standard, service developer, customer adapter and customer developer. Figure 2.4 represents these types of provider with examples of their service offerings, on the basis of firms' general capabilities in solving problems and the extent of customisation. Standard 3PL providers offer services such as warehousing, distribution and packaging, whereas service developers offer advanced value-added services such as cross-docking, tracking and special security services, customising these to clients' needs. Although customer adapters also offer customised services, they differ from service developers in terms of the number of customers they serve. The customer adapter offers specific services to a very limited number of customers by taking over customers' existing activities (i.e., warehousing) and improving their efficiency. The customer developer, in contrast, offers integrated and customised services and is responsible for the coordination and development of customers' existing activities and designing the supply chain.

On logical grounds there is no compelling reason to argue that the interdependent nature of relationships among sellers, buyers and 3PL providers, and the extent of providers' abilities to meet individual customer demand, add new dimensions to 3PL such as partnership and consolidation, thereby widening the scope of the 3PL concept.

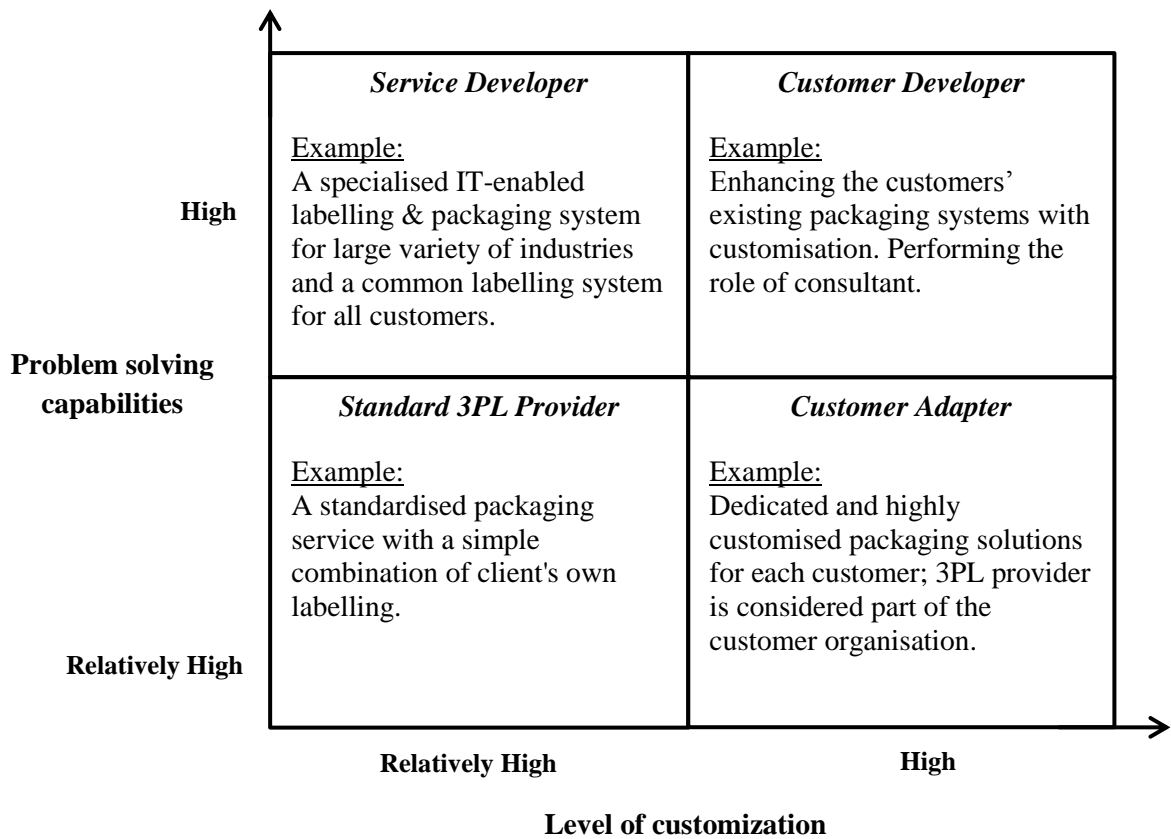


Figure 2.4: Classification of 3PL providers

Source: adapted from Hertz and Alfredsson (2003)

2.4 BRIEF HISTORY OF 3PL

There has been an unprecedented trend toward outsourcing in the last two decades, although it is difficult to identify a specific time or event as the trigger of outsourcing or related activities. 3PL did not emerge as the consequence of a sudden breakthrough or as the embodiment of a new theory by a management professional or academic. The evolving history of third party logistics differs significantly by geography. Although companies in various countries have been involved with international trade for hundreds of years, the business model for 3PLs is less than 50 years old. Figure 2.5 depicts a timeline of several critical dates and developments over the past half-century, which outline how the industry evolved and coalesced into what it is today (Mayer, 2013).

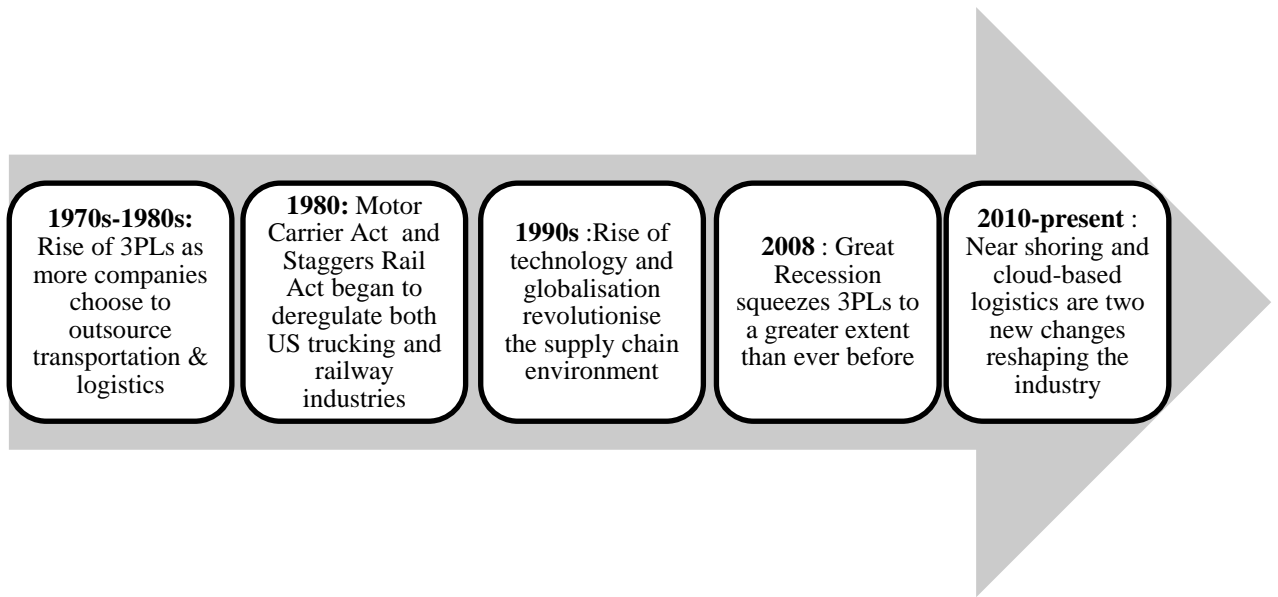


Figure 2 5: Historical timeline of the 3PL industry

Source: Mayer (2013, p. 6)

Papadoppulo (2001), Papadoppulo and Macbeth (1998) divide the evolution of 3PL into six main phases according to the type of services provided, the level of control exercised and the level of strategic importance played in companies’ strategies (Table 2.1). The following section maps out the historical development of 3PL in six phases by emphasising the layers of 3PL providers, type of services they provide and the major environmental factors affecting companies’ strategies.

Table 2.1: The six phases of 3PL evolution

Phase Period	Phase Name	Characteristics	Type of services
Early1900s–late 1950s	Introductory	Single services	Only transportation and warehousing
Late 1950s–mid 1960s	Awareness	Separate services	Either transportation or warehousing
Mid 1960s–late 1970s	Necessity	Integrated services	Combine transportation and warehousing
Late 1970s–late 1980s	Integrated	Combined services	Extra services like trade administration
Late1980s–late1990s	Differentiation	Complex combined	Network of different services
Late1990s–today	Incorporation	Corporate services	Corporate services (including 4PL services)

Source: Papadoppulo et al., 2001, p. 9

2.4.1 Introductory phase

The introductory phase of 3PL is referred as its infancy. During this period companies provided only a single service such as transportation and warehousing, similar to the services provided by the first party logistics (1PL) providers (Figure 2.6). 1PLs are single service

providers who usually specialise in certain goods, branches and shipping methods. 1PL may be considered a shipper (such as a manufacturing firm delivering to customers) or a consignee (such as a retailer picking up cargo from a supplier) (Kent and Flint, 1997). The period from 1900 to 1950 is considered an introductory period; even in the early 1990s, logistics was considered a tool of marketing and companies used 1PL only on when there were significant costs involved, or transportation shortages. The providers kept full operational control of their services, which were mostly limited to transportation (Papadoppulo, 2001). Despite the limited services and high level of control, there were few technological innovations in manufacturing or vehicle routing to instigate further 3PL development (Papadoppulo and Macbeth, 1998).

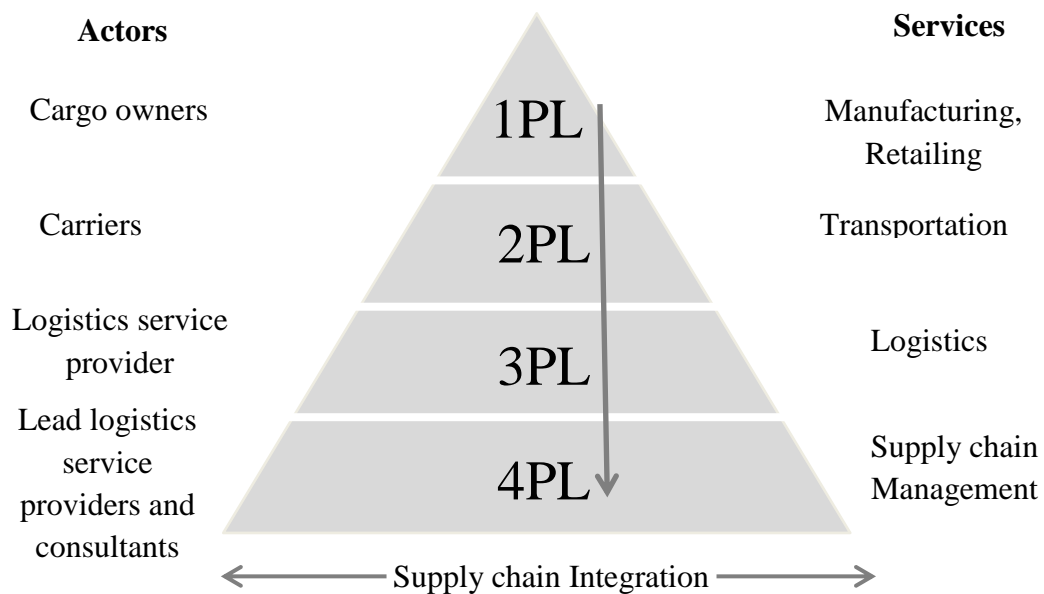


Figure 2.6: Layers of logistic service providers

Source: TransportationInsight (2014, p 7)

2.4.2 Awareness phase

In the second phase, the concept of 3PL gained popularity. Companies started to consider a third party as an alternative for a few of their in-house activities such as warehousing, transportation and inventory control. This phase was characterised by separate and specialised services which were similar to the services offered by second party logistics (2PL) providers. 2PL refers to service providers who offer specialised logistics services in a larger (national) geographical area than 1PLs do. 2PLs are the actual carriers that transport the product. Often there was a contract between the 2PL and the customer regulating the conditions for transport

duties, mostly short-term. 2PLs provide their own external logistics resources such as trucks, forklifts, warehouses etc., for transportation, handling of cargo or storage. It is believed that 2PLs arose in the course of globalisation and with the growing trend toward lean management, when companies began to outsource logistic activities and focus on their core competencies (Kent and Flint, 1997). During this phase companies' strategic focus shifted to long-term planning and decentralisation; consequently, logistics providers offered the benefits of outsourcing. A few popular scholars of business, such as Charles Handy (an author/philosopher specialising in organisational behaviour and management), Peter Drucker (a management consultant) and James Brian Quinn (specialising in strategic planning and the management of technological change) helped both the companies who demanded outsourcing services and the suppliers who provided them, to better understand the drivers and significance of outsourcing.

2.4.3 Necessity phase

This phase is considered the starting point of the adoption of multiple 3PL services by companies. Compared with 2PL, third party providers were able to provide combined services including warehousing, transloading, terminal operations, packaging and labelling. During this period significant market and legal changes took place which necessitated the use of external companies: for example, in the 1970s when companies ran out of space during their busy seasons, they started to buy or rent space in public warehouses (Aghazadeh, 2003). Some firms were encouraged to adopt a few diversification strategies such as horizontal and vertical integration of their core activities in sequential and/or parallel form (Porter, 1987). However, it was becoming evident that vertically integrated large and diverse corporations were underperforming, and earning disappointing rate of returns which became worse during the 1980 global recession (Gattorna and Day, 1986). Businesses who adopted vertical integration or internal integration of supporting activities were later encouraged to outsource their supporting activities (Davis, 1987), and both academic studies and corporate strategies advocated concentrating on fewer core activities and outsourcing the rest of a company's supported activities (Rumelt, 1974). Many highly successful companies like Sony, Mitsubishi, 3M and Hewlett-Packard contracted out many of their supply functions during the 1960s and 1970s.

2.4.4 Integration phase

The phase, to some observers, indicates that 3PL is nothing new, as most organisations had already looked outside their boundaries for legal, financial, accounting, payroll, cafeteria management and raw material supply services many years previously (Papadoppulo and Macbeth, 1998). However, apart from such standard offerings, 3PL providers were able to provide value-added services such as trade administration and planning; and companies started to view the use of 3PL as an important strategic decision. Public sector reforms in the UK, with their combination of privatisation and contracting-out in the 1980s, reinforced the idea that a third party might work more efficiently than an in-house department (Lonsdale and Cox, 2000). The adoption of integrated 3PL services was stimulated by factors such as company deregulation, shipment consolidation, improvement of telecommunications and computers, and complex distribution channels. During this phase integrated 3PL services were considered more than a company necessity (Buck, 1988 in, Papadoppulo and Macbeth, 1998) This new logistic trend attracted considerable attention from academia, to the extent that there was a call to investigate logistics issues as a separate, new academic discipline (Wilson and Fathers, 1989).

2.4.5 Differentiation phase

Third-party logistics was identified as a separate industry and service, and as a subject for academic investigation and analysis, only in the late 1980s. At this time companies had started to consider 3PL as a point of difference because its services contributed to leverage logistics operations (Shapiro, 1984). It was claimed by Sharpe (1997) that Eastman Kodak was the first company to adopt outsourcing, in 1989, contracting three outside firms to fulfil its IT needs. Subsequently a new and specific type of demand from big companies was created, driving the growth of a new industry related to outsourcing. During the 1990s the trend toward outsourcing primary supply chain activities was limited, but afterwards a radical change took place in the way that firms thought about the provision of outsourcing for primary activities, and their integration with overall supply chain (Sharman, 1984). During the late 1990s, 3PL services expanded faster than before, and the first signs of intense competition among the available services were observed (Sheffi, 1990). It can be argued from this information that the growth of global activities, the increased complexity of distribution channels, technological advancements, the growing demand for integrated marketing and logistic activities, and trade policies were factors that accompanied the new logistics trend (Lambert and Cook, 1990). The phase of differentiation has characteristics very similar to

recent 3PL services that are predominantly providing integrated, highly complex, network services.

2.4.6 Incorporation phase

The incorporation period is characterised as the phase of corporate services which integrates and manages a company's logistics resources and logistic service providers (LSP), including 3PL providers and other transportation companies. Corporate services are very similar to the concept of fourth-party logistics (4PL) providers, first defined in 1996 by Accenture (a management consulting service company). According to Gattorna (1998, p. 429), 'While outsourcing third-party logistics is now an accepted business practice, 4PL is emerging as a breakthrough solution to modern supply chain challenges ... to provide maximum overall benefit'. This implies that 4PL works as an integrator to assemble the resources, capabilities, and technology of its client's organisation and other organisations (e.g., the client's authorised 3PL) to design, build and run comprehensive supply chain solutions (Win, 2008).

There is a logical sequence of events characterising the 3PL evolution, and these are not yet completed. Lonsdale and Cox (2000) argue that outsourcing practices should be viewed neither in isolation nor in a new way. Increasing numbers of academics and managers are expressing interest in identifying how to manage and execute the outsourcing process in more efficient ways. For example, a group survey conducted by PA consulted group in 1996 revealed increasing dependence on the outsourcing of different business activities. Compared with 1991, in 1996 an increasing number of firms were outsourcing different services such as property services, application development, IT technical support, legal services, distribution, infrastructure, maintenance, assembling and manufacturing. Property and application development services were outsourced two and five times more in 1996 than 1991. Growing intentions to outsource such services in 2011 was also revealed in the study. Moreover, according to research by investment banker Lazard Freres and BG Strategic Advisors, the 3PL market has grown at more than 20 per cent per year in the last decade (Lonsdale and Cox, 2000); there is no reason to think that outsourcing practices will reverse to minimise the limitations of 3PL services.

The 3PL industry has undergone continuous development in terms of its service offerings, and has been shaped over time by external environmental factors. Since the inception of the industry, it has endured huge transitions and is currently competing in a highly fragmented

high-growth market; it is predicted that 3PL providers will soon be swept up in a massive wave of consolidations (Gordon, 2003, Lonsdale and Cox, 2000). Different layers of logistics service providers have characteristics which are similar to the different phases of 3PL evolution. These layers often overlap: for example, FedEx can be categorised as a 2PL (airline) and a 3PL (courier) as well. DHL is acting as a 2PL (warehouse and trucks owner), 3PL (courier and freight forwarder), and 4PL (actual consulting divisions) simultaneously. Although it seems that the phases of logistics services develop in sequence, global logistics and a competitive market drives organisations to have overlapping layers of logistic services that help them build distinctive capabilities (Gattorna and Day, 1986).

2.5 3PL DECISION MAKING PROCESS

Outsourcing decisions have their origins in make/buy alternatives (Tayles and Drury, 2011). Like every rational decision the companies who decide to outsource use precise and analytical processes to arrive at a fact-based decision. Figure 2.7 portrays the decision-making sequence applicable to any company considering outsourcing.

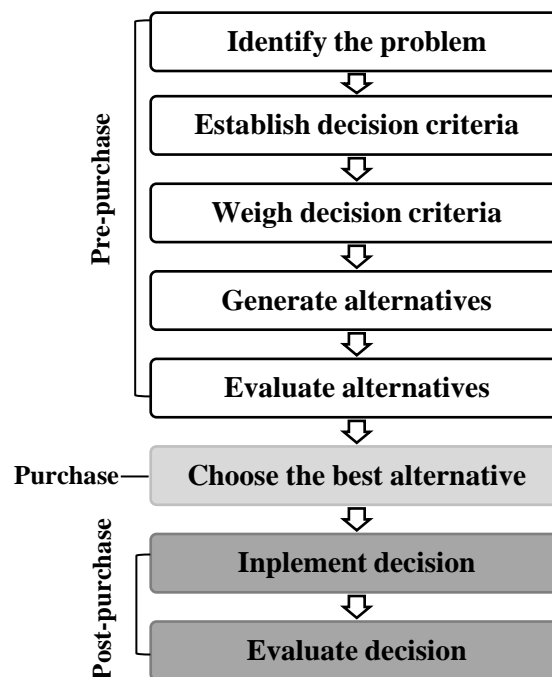


Figure 2.7: 3PL decision making model

Source: Robbins and Timothy (2007)

A significant quantity of literature describes the different steps involved in deciding to engage 3PL services. These include the factors driving such a decision, selection criteria, evaluation, and monitoring the provider's performance. While the decision to use 3PL yields constant positive outcomes for most organisations, the process of achieving those benefits is not without difficulties (House and Stank, 2001). Impediments are likely to be encountered by organisations in different phases of the decision-making process, often leading to the decision to abandon the idea (Ackerman, 1996, Foster, 1999). To counter this, various models and decision-making frameworks have been suggested in the literature in an attempt to improve the 3PL decision making an implementation process (Bagchi and Virum, 1998, Bottani and Rizzi, 2006). For example, Sink et al. (1996) provide a conceptual model of 3PL decision making which consists of five stages: identify the need to outsource logistics, develop feasible alternatives, evaluate and select the supplier implement the service and conduct ongoing service assessment. Andersson and Norrman (2002) model and compare the process for advanced versus basic logistics services, while De Boer et al. (2006) present a prescriptive model to guide outsourcing decisions, incorporating some basic principles of behavioural decision-making theory, in particular the satisficing concept. However, their study only explains discrepancies in existing outsourcing models and outsourcing processes in practice.

Marasco (2008) discusses three aspects of 3PL decision-making: build-up, execution and institutionalisation (Figure 2.8). The dominant aspects of the build-up stage are partner selection, negotiation and contract design. Execution concentrates on planning, communication, coordination and control perspectives. Institutionalisation considers the building of relationships in terms of technical, legal, social and administrative issues. As these various models indicate, research related to 3PL decision-making processes tends to concentrate on finding solutions to the problems experienced by the organisations while selecting 3PL providers, designing 3PL contracts and maintaining 3PL relationships.

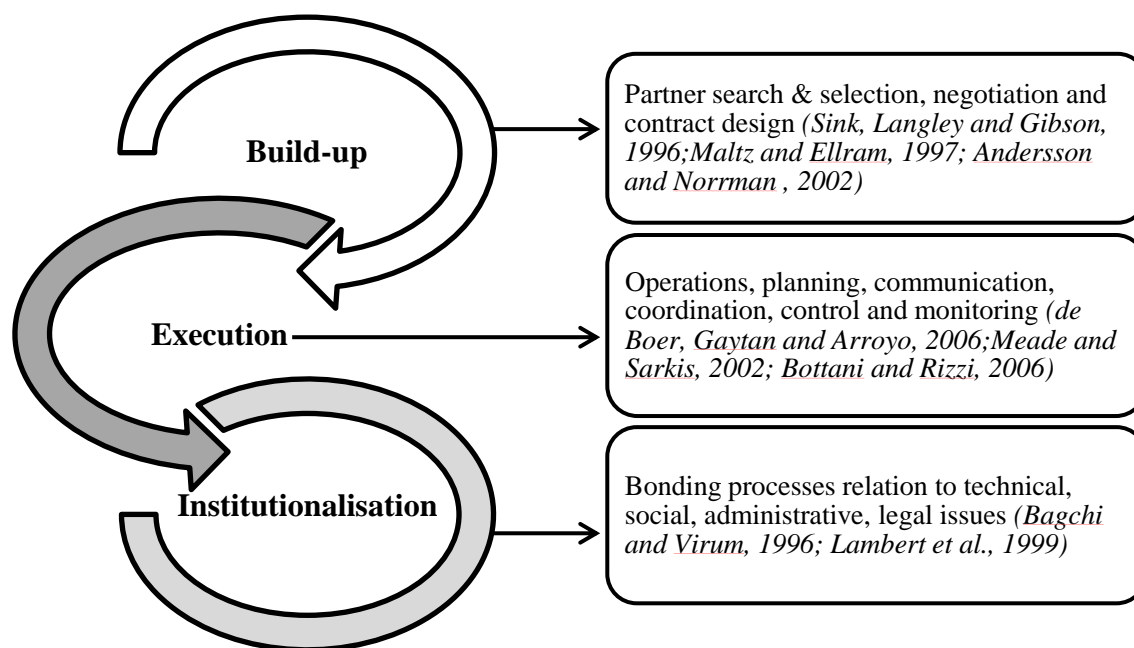


Figure 2.8: 3PL decision-making research

Source: Marasco (2008)

Table 2.2 summarises key studies of the 3PL decision-making process. Most investigate the selection, negotiation and evaluation processes involved in contracting with a 3PL provider, and recommend models or frameworks for improved decision-making. Many existing decision-making models offered in the literature provide improved understanding of 3PL arrangements, structures and partnerships; however, the assumptions underlying many of these models have not been tested empirically. For example, Meade and Sarkis (2002) offer a conceptual decision making model based on the analytical network process (ANP) to assist management in the selection of 3PL providers of reverse logistics support, however, the model is not tested empirically. Boudreau et al. (2003, p. 180) discuss several behavioural assumptions commonly employed by quantitative models, including the idea that ‘people are independent and unaffected physically or psychologically by one another’. It may be assumed that business customers use 3PL services for the cost benefits of outsourcing over in-house service; however, the behavioural reality may be different. For instance, a company may use 3PL services only because of their stakeholders want them to use 3PL. Therefore, the findings from decision-making studies that have not been tested empirically may fail to account adequately for behavioural realities (Tokar, 2010). The degree to which previous research findings hold true in practice remains open to question and implies that the role of

human behaviour in the 3PL decision-making process has not yet attracted adequate attention.

Table 2.2: Key studies on 3PL decision-making process

Author	Approach	Theory	Key focus
McGinnis et al. (1995)	Empirical (survey)	N/A	Effect of organisational strategy and external environment on the selection of third party logistics
Sink et al. (1996)	Empirical	N/A	Qualitative factors such as supplier reputation, references from clients and response to information requests are used for the initial screening of candidate service providers
Maltz and Ellram (1997)	Conceptual	Microeconomic theory (total cost of ownership)	Modified framework of the total cost of ownership, termed as total cost of relationship (TCR), to deal with logistics outsourcing decisions
Sink and Langley (1997)	Empirical (case study, mail survey)	N/A	Emphasises process issues such as need identification, top management commitment, formation of cross-functional buying team, development of selection criteria and service implementation
Bagchi and Virum (1998)	Empirical (case study)	Marketing theory	Understanding of the rationale, the steps involved, the obstacles faced, the effect of the alliance on the shipper and the provider, and what makes the alliances successful
Menon et al. (1998)	Conceptual	Decision theory	Decision-making models and frameworks for the selection process of 3PL service providers
Lambert et al. (1999)	Empirical (in-depth interview)	N/A	Model of partnership development and implementation based on drivers, facilitators and management components
Logan (2000)	Conceptual	Multiple (Agency theory, TCE and RBV)	How to design the types of contracts and relationships necessary to provide and support an environment of trust and mutual satisfaction
Lim (2000)	Conceptual	Microeconomic (game theory)	How a contract can be established so that 3PL providers are encouraged to reveal their true capabilities
Andersson and Norrman (2002)	Conceptual	N/A	Describes and compares the purchasing process for logistics services for companies of more advanced logistics services
Meade and Sarkis (2002)	Conceptual	Decision theory	Selection and evaluation of third-party reverse logistics providers
Aghazadeh (2003)	Conceptual	N/A	Identifies the steps involved in choosing a good 3PL provider in the retail and service industries
Vaidyanathan (2005)	Conceptual	N/A	Selection of 3PL providers built around IT
Bottani and Rizzi (2006)	Empirical	Microeconomic (Fuzzy set theory)	A multi-attribute approach for the selection and ranking of the most suitable 3PL service provider
De Boer et al. (2006)	Empirical (case study)	Decision theory	Prescriptive model that provides effective guidance in the early stages of outsourcing processes

2.6 THEORETICAL PERSPECTIVES ON 3PL DECISION

Applying existing theories from other disciplines to logistic research is not a new phenomenon. Their application provides many benefits: learning from the experience of other scholars, developing knowledge and understanding more quickly, and strengthening the links between logistics and other disciplines are a few (Cetin and Sarkar, 2013). A great deal of supply chain management (SCM) and logistics research is derived from the theoretical paradigms of different disciplines, including strategic management, purchasing, manufacturing, marketing, retailing and, of course, logistics. For example, Blancero and Ellram (1997) apply psychological contract and organisational justice theories to examine strategic supplier partnering (SSP) between buyer and seller. Machuca and Barajas (2004) use human subjects in a controlled experiment to examine the impact of electronic data interchange on supply chain efficiency and the bullwhip effect, using system theory.

Defee et al. (2010) provide a summary analysis of the theories being used in contemporary logistics and supply chain management. They reveal that over 180 specific theories are used from different disciplines in SCM and logistics, which they group under 12 named categories plus an 'other'. These include competitive theory, microeconomic theory, system theory, marketing theory, theories of organisation, sociological theory, social exchange theory, inventory theory, institutional theory, decision theory, innovation theory and psychological theories for individuals. Among these, competitive theory is the most used theory in both logistics and SCM-oriented works; however, the use of the 13 categories in 3PL research was limited compared with their prevalence in broader logistics and SCM research (Figure 2.9). The research in the 3PL domain mostly concentrates on microeconomic and competitive theories; decision and marketing theory are the only other two used in 3PL context (Defee et al., 2010).

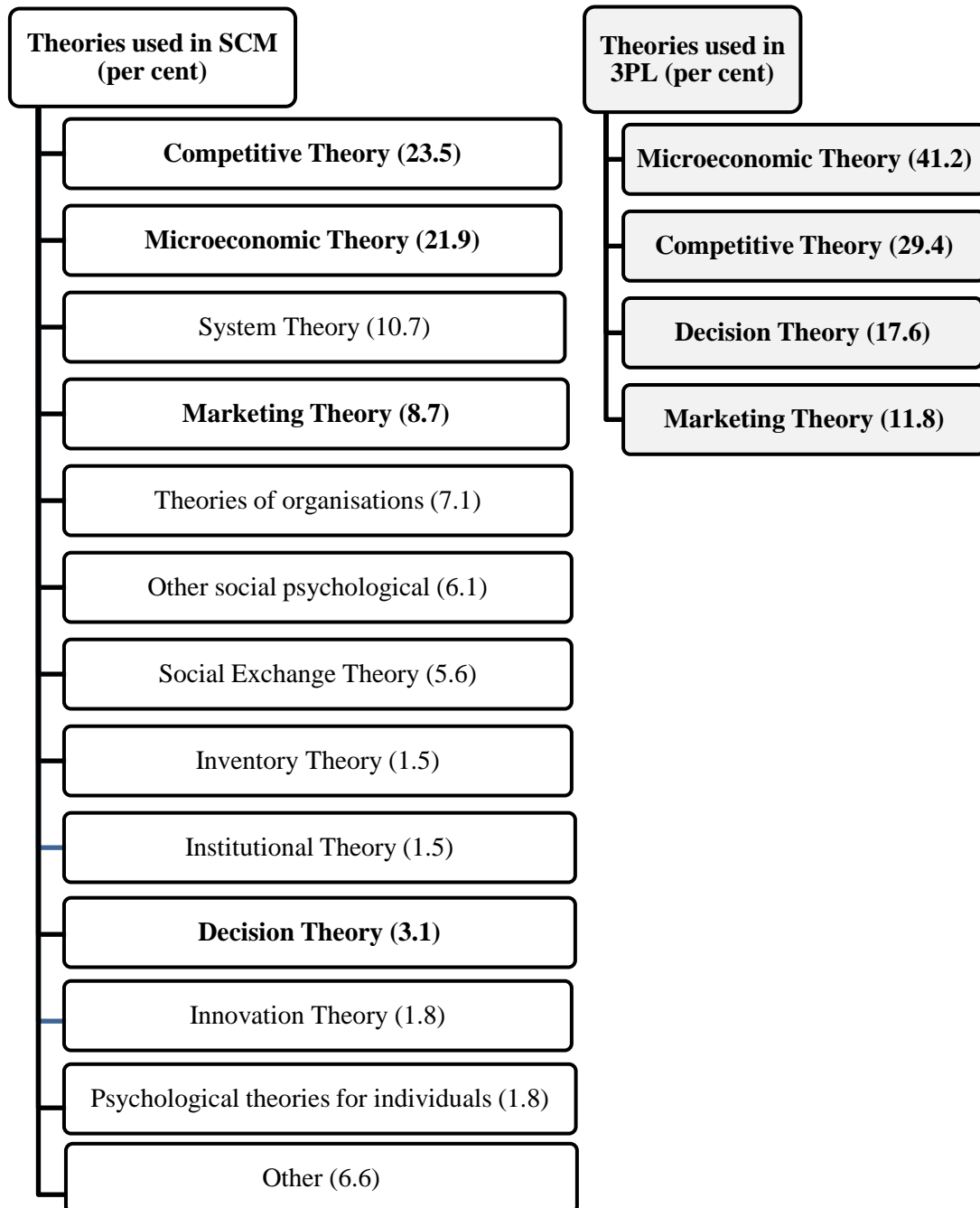


Figure 2.9: Theoretical categories in 3PL and SCM

Source: adapted from Defee et al. (2010)

2.6.1 Microeconomic theory in 3PL

According to the study by Defee et al. (2010), the frequency of microeconomic theoretical incidents in 3PL context is 41.2 per cent. 3PL research has utilised different microeconomics theories such as transaction cost economic theory, agency theory, diversification theory, total cost of ownership theory, inter-organisational condition theory and unified integration model

theory (Skjoett-Larsen, 2000, Logan, 2000). For example, Williamson (2008) examines outsourcing from a transaction cost economics (TCE) perspective, a microeconomics theory. He describes the process of the contract approach to economic organisation and different styles of outsourcing through the lens of TCE theory. Kumar and Kopitzke (2008) have utilised another microeconomic theory, the total cost of ownership as a theoretical foundation for developing an analytical model of outsourcing costs. They examine tangible (i.e. shipping costs, inventory costs, exchange rates, tariffs and taxes) and intangible costs (i.e. political and economic risks, management and control costs) of outsourcing manufacturing from the United States to Mexico and China. The resulting model provides guidance for determining outsourcing costs and their sensitivity to different variables such as production place, type of product to be produced, and product components.

2.6.2 Competitive theory in 3PL

Competitive theory is the second (29.4 per cent) most frequently used theoretical grouping in 3PL research (Defee et al., 2010). In broader logistics and SCM, resource-based theory is one of the most commonly used of the various competitive theories, and it is also utilised in the context of 3PL. For example, Lai et al. (2008) investigate both the antecedents and consequences of IT capability among 3PL providers by integrating the concept of technology orientation from strategic orientation literature into resource-based theory. Chee and Chew (1999) examine the different strategic postures of logistics providers in Singapore by using Porter's competitive framework, and analyse business performance, technologies, operations objectives, and future plans. A few 3PL studies have used two theories (grouped under competitive theory) jointly to develop theoretical foundations for analysis. For example, in search of developing new logistics competencies in 3PL relationships Halldó rsson and Skjoett-Larsen (2004) utilise both a resource-based view and core competency theory.

2.6.3 Decision theory in 3PL

Decision theory is the third most prevalent theory in 3PL studies. Theories such as auction theory, decision theory, vehicle routing problem optimisation and negotiation theory are grouped into the broad category of decision theory. To develop a conceptual model for selecting and evaluating third-party reverse logistics providers, decision theory is used by Meade and Sarkis (2002). As reverse logistic providers' organisational roles are different from traditional logistics providers', the researcher use the ANP decision model, which is a

general form of the analytic hierarchy process (AHP) (Saaty, 1996). Apart from this, few 3PL researches have utilised auction theory for the development and negotiation of 3PL contracts.

2.6.4 Marketing theory in 3PL

Marketing theories are heavily slanted toward a few topics such as buyer-supplier relationships, customer attributes, collaboration and alliances, in the 3PL context. Sink et al. (1996), investigate the buyer's perceptions of third party logistics services and providers in the United States. Knemeyer and Murphy (2005) provide a comparison of users and providers of 3PL with respect to relationship marketing elements such as trust, communication, reciprocity, attachment, customer recovery and retention; they examine manufacturers as buyers of 3PL services. Knemeyer and Murphy (2004) also take the relationship marketing perspective as the basis for evaluating the perceived performance of 3PL arrangements. Moore and Cunningham (1999) examine social exchange behaviour in logistics alliances and transactional relationships, based on the theoretical background of alliance theory and exchange theory.

2.7 FACTORS DRIVING THE 3PL DECISION

The increased use of 3PL has drawn considerable attention, which encourages researchers to seek a deeper understanding of 3PL-related issues and to understand the impact of different internal and external factors on 3PL decisions. The following section discusses relevant research findings on key external and internal factors. As decision making is predominantly a human trait, a brief discussion is offered on the importance of understanding the impact of behavioural factors in decision-making process. Figure 2.10 provides representative lists of the external, internal and behavioural factors that affect 3PL arrangements, development and relationships.

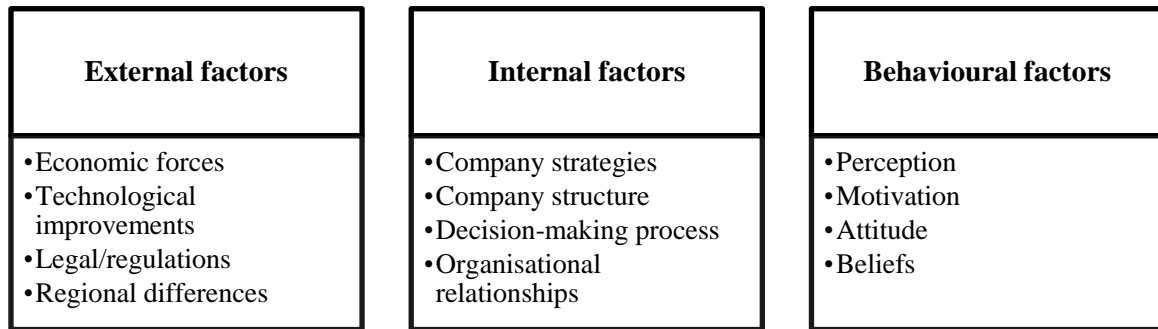


Figure 2.10: Factors driving 3PL decision-making

2.7.1 External factors

External factors are those forces outside an organisation's control that affect its performance and productivity. These may be economic, technological, legal or regional, acting as driving forces behind the 'make or buy' decision. McGinnis et al. (1995) argue that the decision to use 3PL services is affected not only by the process of selecting 3PL providers but also by the firm's competitive responsiveness strategy, or external environment. Sheffi (1990) analyses how changes in economic factors, regulations and technology influence the development of 3PL. Generally, cost is considered as the main driver of outsourcing; however, nowadays it may have little importance if performance criteria are not met. Consequently, many factors are considered as instigators for using 3PL services later on. These include changing patterns of business operations (Byrne, 1993), lack of specific knowledge of customer, regulation and infrastructure issues in global logistics (Foster and Muller, 1990, Rao et al., 1993), just-in-time (JIT) principles (Sheffi, 1990, Trunick, 1989), the versatility of 3PL services (Trunick, 1989), advancement of information technology (Langley et al., 2002, Langley et al., 2005), and e-commerce (Delfmann et al., 2002, Koh and Tan, 2005).

The ninth annual study of 3PL Langley (2004), reveals several more factors, such as the rapidly accelerating introduction of new products, and consolidations, mergers and acquisitions, that drives 3PL use around the world. Recent mega-mergers such as Deutsche Post–AEI–Danzas, UPS–Fritz, Kuehne & Nagel–USCO and Exel–Mark VII exemplify the upcoming trend toward consolidation (i.e., merger and acquisition). Such dynamics can be expected to pose major challenges and opportunities and so demand the attention of supply chain academics and professionals (Gordon, 2003). Specifically, the trend toward consolidation is demands attention to 3PL research from the perspective of soft aspects (e.g., behavioural issues) that are expected to arise in mergers and acquisitions. When organisations

merge, their personnel, who are human and they are driven both by their shared organisational and social cultures and their individual personalities, perceptions and attitudes. These influence every facet of the new organisation's functions, including its decision making processes, leadership style, ability to adapt to the change, and teamwork (Dixon, 2005). It is true that academic literature concerning 3PL continues to address recent issues regarding 3PL challenges and opportunities; however, it mostly concentrates on the operational perspective. There is a strong need to advocate and facilitate research that focuses on the effects of human behaviour, judgment and decision making in logistics and supply chain management (Tokar, 2010).

The impacts of economic, technological and regulatory factors vary across markets, depending upon economic conditions and the business acumen of 3PL users or future users. Every market behaves differently, and the use of 3PL varies in response. To improve decision making in a particular context it is vital to gain market intelligence. New 3PL users may have difficulties obtaining customised information such as firm-specific statistics, usage patterns, and trends in a specific country's 3PL market. Consequently, a considerable portion of 3PL literature concerns studies of 3PL practices from the perspective of a specific country (Sohail and Al-Abadil, 2005, Dapiran et al., 1996), cross-country (Sohail et al., 2006) or region (Lieb and Bentz, 2004), investigating the driving forces of 3PL use, differences and similarities of 3PL trends, practices, and decision-making processes in different countries and regions.

2.7.2 Internal factors

As well as external factors, 3PL decision making is affected by various internal factors such as company strategies, structure, and relationships with stakeholders (Bask, 2001). A significant amount of research has been done at organisation level, focusing on the strategic perspectives of 3PL decision. This includes strategic segmentation (Berglund et al., 1999), the strategic choice of business competition (Yeung et al., 2006), strategic development (Hertz and Alfredsson, 2003) and strategic relationships (merger, acquisition and logistic alliances) either from a single country or cross-country perspectives (Carbone and Stone, 2005).

Apart from the strategic focus, decision making process also focused on how to execute and continue a contract or relationship. For example, De Boer et al. (2006) suggest different models and decision frameworks, presented either in conceptual form or tested empirically, to deal with impediments to building a 3PL relationship. This research also reveals that during

and after the implementation of outsourcing it is essential to contemplate internal factors that are critical for maintaining outsourcing relationships. A representative list of these critical success factors is presented in Table 2.3.

Table 2.3: Critical success factors of outsourcing

Critical success factors of outsourcing	Key studies
Ensuring two way communication between 3PL user and provider	Andel (1994), Bowman (1995), McKeon (1991) and Trunick (1989)
Internally communicate what is outsourcing and why	Bowman (1995), Richardson (1990) and Maltz (1995)
Building mutual trust and faith Flexibility Commitment, maintaining fairness Ensure compatibility	Bradley (1995) and Sheehan (1989)
Customer focus Establishing operating standards Monitoring performance against those standards	Richardson (1990)
Understanding each other's cultures and organisational structure Indulgent of logistic strategy	McKeon (1991)
Specification of the role of each party in the partnership Ground rules, procedures and policies clearly spelled out Inclusion of exit provisions for terminating the partnership	Bowersox (1990)

3PL research has also focused on how the organisational characteristics and structure of 3PL arrangements are related to the 3PL decision making process and relationship (Daugherty and Droge, 1997, Murphy and Poist, 1998). For example, House and Stank (2001) investigate the difficulties in 3PL relationships that arise from organisational characteristics (Maltz and Ellram, 1997). Marasco (2008) examines the influences and impact of internal factors from a content analysis perspective, dividing all influencing internal and external factors into five broad aspects: context, structure, process, outcome and comprehensive. The analysis of the articles listed in the research reveals that these five aspects were heavily explored during 2000–2005 (Figure 2.11). However, the most dominant aspect is context-specific, examining 3PL issues from both internal (shipper/providers) and external (macro-environmental supply chain network factors) contexts. The second most studied aspect is the 3PL process, which includes factors such as partner selection, negotiation, contact design, coordination, control, monitoring and bonding processes, and their impact on 3PL decisions. Few 3PL structure-related issues such as the scope of relationships, formalisation, continuity, trust and commitment, are emphasised.

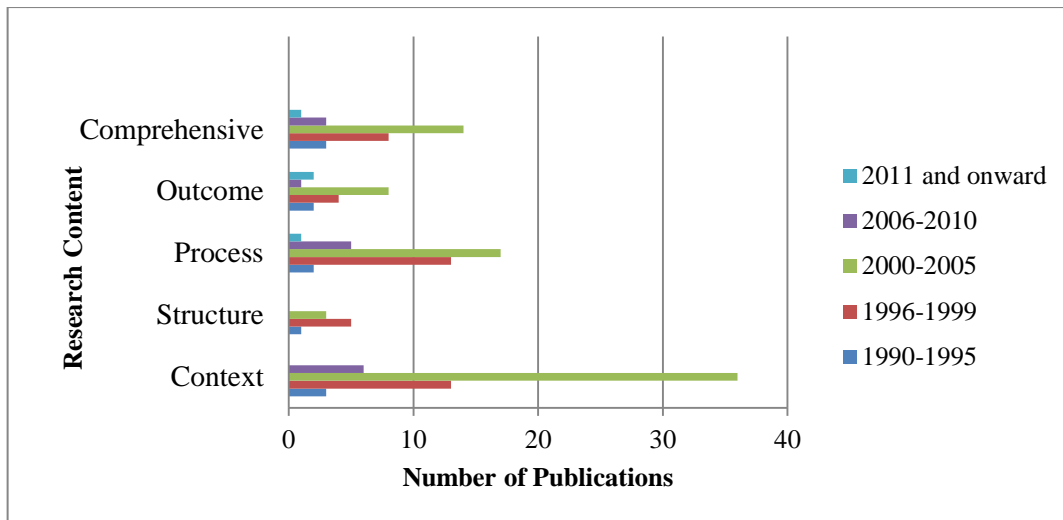


Figure 2.11: Different aspects of 3PL research content

Source: adapted from Marasco (2008)

The search for the impact of internal factors on 3PL decision making from integrative perspectives by different researchers (Selviaridis and Spring, 2007, Marasco, 2008, Nuñez-Carballosa and Guitart-Tarres, 2011) has pointed to the interactive pattern of different internal factors (e.g. interdependence of company structure, strategies and relationships), which have received due importance in the 3PL literature.

2.7.3 Behavioural factors

Apart from external environmental factors and inter and intra-organisational factors (broadly termed internal factors), the 3PL decision is also influenced by different behavioural factors. Motivations, perceptions, beliefs and attitudes are some psychological factors that affect the organisational decision-making process. A few studies have been conducted in logistics and the SCM context that emphasise behavioural factors such as perception and motivation. For example, customer perceptions and evaluations of the purchasing experience are examined by Esper et al. (2007) to investigate the effects of online retail delivery strategies on consumers. Past studies of 3PL also investigate the buyer's perception of third party logistics services and providers in the United States (Sink et al., 1996). Although some studies consider other behavioural factors such as trust, commitment and equity (Knemeyer and Murphy, 2005, Moore, 1998, Moore and Cunningham, 1999), and some relationship marketing elements such as attachment, communication, dependence, investment, opportunistic behaviour, reciprocity, reputation, customer referrals, customer retention, service recovery and performance improvements (Knemeyer and Murphy, 2005), in the 3PL context, those are descriptive at

best. Relying only on descriptive aspects fails to broaden the understanding of the psychological factors embedded in the 3PL decision-making process. Research on 3PL decision making concentrates mostly on aspects of the post-decision-making process (when the company has already decided to outsource); pre-purchase behaviour (whether to make or buy) and the factors that impact on the decision to use or not to use 3PL, remain understudied.

The decision to use or not use 3PL services depends on the intention of a business customer. Intention to use 3PL can be defined as the customer's level of readiness to make the decision, even though intention may not always be converted into the decision to use 3PL services. As the famous lyricist and novelist Paulo Coelho (1998, p. 7) rightly says, 'there is always a gap between intention and action'. The gap exists because of the presence of factors that create obstacles to converting intention into action. These may be external environmental factors or internal organisational factors, which have been largely investigated in the literature. They may also be behavioural, such as the attitude toward 3PL, peers' influence in outsourcing decisions, and the decision-making role itself. These attitude, social influences and perceived control, which may have a significant impact on someone's decision making process, have attracted less academic attention.

2.8 SUMMARY

This chapter has focused on the dominant theme of interest in this research: third party logistics. The descriptions of 3PL, and its diverse prior research, have an evolutionary history. The chapter has presented insights from different aspects of 3PL research including its definition, evolution history, key 3PL decision-making research findings, theoretical underpinnings and, most importantly, the need for investigation of the behavioural aspects of 3PL decision making. This discussion justifies the research gap and lays the foundations for discussion on theoretical framework of this research.

There are five key findings in this chapter:

- There is no consensus on a single 3PL definition but many different aspects of the concept, depending upon the 3PL functions, client-provider relationships and country differences.
- The concept of 3PL and its strategic focus have evolved sequentially from market through segmented, integrated, customer, differentiation and recently consolidation.

- The 3PL decision-making process is affected by different external (e.g., technological development, globalisation and economic development), internal (e.g., company strategies, structure and relationships) and behavioural (e.g., motivation, perception and attitude) factors.
- The most commonly identified theories in 3PL research are microeconomic and competitive theories. Decision and marketing are the only other theories used in 3PL research.
- There is a lack of understanding of the importance of continuous involvement and interaction of decision makers in the 3PL decision making process and of the different psychological factors that influence the 3PL decision.

The next chapter will review the literature on behavioural theories with emphasis on the theory of planned behaviour. Discussion of behavioural theories in relation to the research gap will lay the foundation of the theoretical framework in Chapter 3.

CHAPTER 3

A THEORETICAL FRAMEWORK – THE THEORY OF PLANNED BEHAVIOUR

3.1 INTRODUCTION

Chapter 3 establishes a theoretical framework for modelling the intention to use 3PL services. This chapter begins with a brief discussion on the importance of behavioural theories in logistics and supply chain management (SCM) research, and behavioural theories such as those of reasoned action, interpersonal behaviour and planned behaviour. The theory of planned behaviour (TPB) is adopted as the theoretical framework of this research. A detailed discussion of TPB emphasises its applicability in predicting a wide range of behaviours, which justifies using it as a theoretical framework. It describes the evolution of the theory of planned behaviour and establishes a modelling framework that identifies the underlying behavioural factors affecting the intention to use 3PL services. This chapter concludes with a description of the limitations of TPB and a summary of the chapter's findings.

Specifically, this chapter addresses the following questions:

- What theories predict behavioural intention and behaviour?
- Why is the theory of planned behaviour adopted for modelling the intention to use 3PL?
- How has the theory of planned behaviour evolved?
- What are the key behavioural factors that drive the intention to use 3PL services?

3.2 APPLICATION OF BEHAVIOURAL THEORIES

Behavioural theory, in simple terms, is about explaining the major psychological factors that encourage or discourage a person's behavioural intentions and actions. For several decades researchers have investigated the reasons behind a person's behaviour in different contexts. A comprehensive understanding of the motives behind behavioural intention and action is essential for researchers and policy makers who seek strategies to motivate behavioural change. An organisational decision making process in a 3PL context is no exception. The integration of behavioural research with the 3PL context is required to ensure that behavioural factors, such as human perception, attitude, behaviour, value judgment, beliefs and others' influences in decision making processes, are taken into account when decisions involving 3PL (Dunn et al., 1994, Camerer and Lowenstein, 2003).

Prior research suggests that the field of logistics should be at the forefront of behavioural research because of the high number of human interactions evidenced in this field (Tokar, 2010). According to the Council of Supply Chain Management Professionals (CSCMP,

2008), behavioural research in supply chain management is of equal importance because the process of decision making involves multiple decision makers (e.g. suppliers, customers and service providers) from different organisations. Tokar (2010) argues that unless behavioural realities are built into models of logistics activities and incorporated into theory, the accuracy and usefulness of decision-making judgments is limited.

Many behavioural theories, such as those of reasoned action, interpersonal behaviour and planned behaviour, have been applied in different contexts to predict behavioural intention. These theories have demonstrated their ability to predict human behaviour in different contexts and provide good explanatory power across a wide variety of decision-making contexts (Albarracín et al., 2001, Armitage and Conner, 2001, Hagger et al., 2002). Although a few social cognition models (e.g. motivational, behavioural enaction, and multi-stage models) also have been used for predicting behavioural intention, most do not explicitly address post-intentional actions (Luszczynska et al., 2005) such as behaviour. This thesis argues that intention, as a predictor of behaviour, should be supplemented with other pre-intentional factors that facilitate the translation of intention into action; therefore, three behavioural theories namely, the theory of reasoned action, the theory of planned behaviour and the theory of interpersonal behaviour, and their use in predicting behavioural intention, are discussed briefly here.

3.2.1 The theory of reasoned action

The theory of reasoned action (TRA) was developed by Martin Fishbein and Icek Ajzen as an improvement over the information integration theory (Ajzen and Fishbein, 1980). According to TRA, behavioural intention is caused by two factors: attitude (evaluation of target behaviour) and subjective norms (perceived social pressure regarding performance of the behaviour) (Figure 3.1). The theory also assumes that the studied behaviour should be under volitional control; however, not all behaviours are fully volitional or fully controlled by the individual (Ajzen, 2005). For instance, when a person intends to buy the most fuel-efficient car, the decision may be influenced by members of the family or other reference groups. In this case, the individual may change his/her intention due to the factors those beyond personal control.

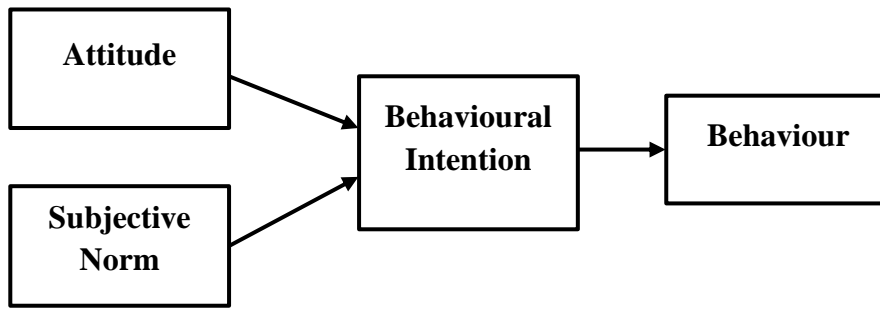


Figure 3.1: Theory of reasoned action, Source: Ajzen and Fishbein (1980)

3.2.2 The theory of interpersonal behaviour

The theory of interpersonal behaviour (TIB) was proposed by (Triandis, 1980 in , Zhang et al., 2006) which include few of the behavioural determinants of TRA. According to TIB, behaviour is determined by three dimensions: intention, facilitating conditions and habit; whereas intention itself is determined by five constructs: affect, perceived consequences, perceived social norms, personal normative belief and self-identity (Figure 3.2). As well as the common determinants noted by other theories, it also considers cultural, social and moral factors. TIB takes into account habits and facilitating conditions as intervening between intention and behaviour, while TPB emphasises that behaviour is a direct function of intention.

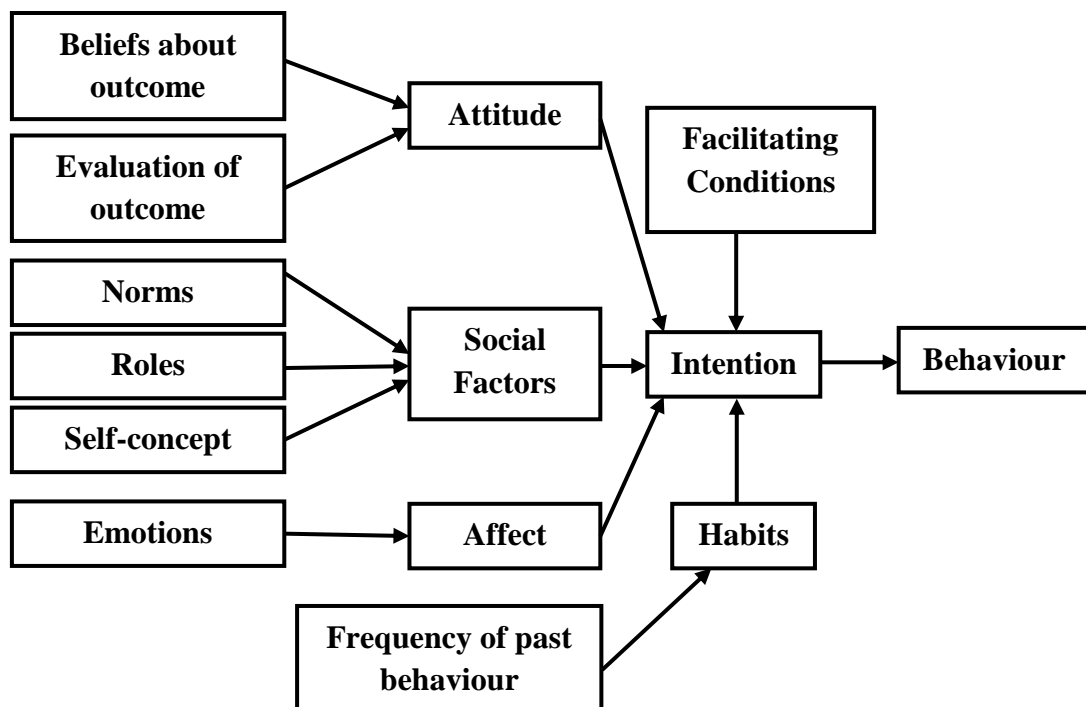


Figure 3.2: Theory of interpersonal behaviour, Source: Triandis (1980)

3.3.3 The theory of planned behaviour

The theory of planned behaviour (TPB) is an extension of the theory of reasoned action, designed to predict and explain human behaviour in a specific context. TPB extends the boundary condition of volitional control specified by TRA. According to TPB, behavioural decisions are not made spontaneously, rather are the results of attitude, subjective norms and perceived behavioural control (perceived control over the performance of the behaviour) which influence behaviour primarily through their impact on intention (Figure 3.3); hence, the more one intends to engage in a particular behaviour, the more likely one is to engage in it (Ajzen, 1991).

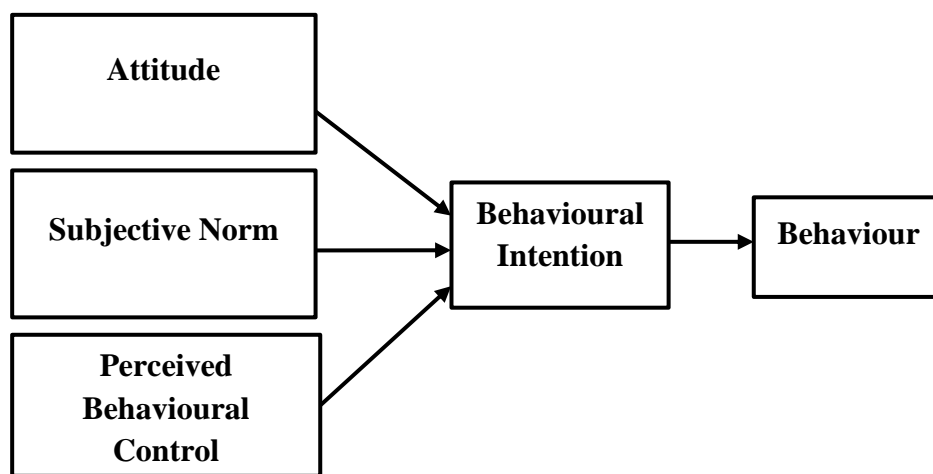


Figure 3.3: Theory of planned behaviour, Source: Ajzen (1991)

TAR, TPB and TIB are well-established social psychological theories. Of the three, TPB has been the most influential and well-supported theory for predicting human behaviour (Ogden, 2003, Sutton, 1998). Overall, research in different contexts has offered extensive support for the ability of TPB to predict a wide range of behaviours (Armitage and Conner, 2001): for example, TPB has been applied in studies of healthy eating (Astrom and Rise, 2001), alcohol and tobacco use (McMillan and Conner, 2003), blood donation (Giles and Cairns, 1995), volunteering behaviour (Warburton and Terry, 2000), green marketing (Kalafatis et al., 1999), branding (Fin and Kang, 2011), banking (Yousafzai et al., 2010) and organic products (Kim and Chung, 2011).

The applicability of TPB for different purposes of research also contributes to its increasing popularity for predicting intention and behaviour. It can be used for one of four purposes (Francis et al., 2004) such as to predict the intentions of a particular behaviour, understand the

influences of the predictors, design an intervention strategy, and evaluate the strategy. More specifically, researchers can use TPB to predict variance in intentions for target behaviour. Researchers can also identify the salient beliefs (such as behavioural, normative and control beliefs) that contribute to the three predictor variables (attitude, subjective norms and perceived behaviour control). Alternatively, considering both salient beliefs and predictor variables, researchers can focus on understanding only one of the predictors (e.g. attitude) to determine the strength of its relationship with intention. Intervention strategies can be designed by assessing the influence of each predictor, so that most powerful predictor can be modified later to change the behaviour. It is also possible to assess one or some of the predictors in the model in a longitudinal study to determine the effect of an intervention of any of the variables (Hardeman et al., 2002).

As well as the original TPB variables, the theory allows the inclusion of external variables relevant to specific behaviour (Manstead and Parker, 1995), which gives it wide applicability in different disciplines. For example, in a study of predicting donating intention and behaviour, Smith and McSweeney (2007) find that ‘past behaviour’ and ‘moral norms’ (along with three basic determinants of TPB) are good predictors of intention and behaviour. In a different approach, to adapt to Chinese Confucian culture and social pressures Fin and Kang (2011) include ‘group conformity’ and ‘face-saving’ along with standard TPB predictors to predict the intention of Chinese subjects to purchase US-branded apparel.

The popularity of TPB is increasing because of its strong empirical support and widespread applicability in diverse disciplines to predict different intentions and behaviours. Although no formal content research has been conducted to trace the volume of TPB research in academic journals of different disciplines, Table 3.1 provides a list of journals that have published heterogeneous TPB research across disciplines. The list is based only on the literature studied by the researcher in the course of this research.

Table 3.1: Major journals in different disciplines that publish TPB-related research

Discipline	Journal	Refereed Articles
Psychology	British Journal of Social Psychology	Ajzen et al. (2009)
	Journal of Applied Social Science	Giles and Cairns (1995); Hagger and Chatzisarantis (2005)
	Journal of Applied Social Psychology	Perugini and Bagozzi (2001)
	British Journal of Addiction	Arvola et al. (2008)
	MIS Quarterly	Godin et al. (1992); Pavlou and Fygenson (2006)
Consumer Behaviour	Leisure Science	Ajzen and Driver (1991)
	Clothing and Textile Research Journal	Kim and Karpova (2010)
	Journal of Consumer Marketing	Fin and Kang (2011)
	Social Science and Medicine	Conner et al. (2001)
	Journal of Retailing	Shim et al. (2001)
	Transportation Research Part F	Cestac et al. (2014); Waddell and Wiener (2014)
Logistics	Transportation Research Part F	Castanier et al. (2013)
	Environment and Behaviour	Cheung et al. (1999)
E-Commerce	Journal of Applied Social Psychology	Beale and Manstead (1991); Yousafzai et al. (2010)
Management	Forest Policy and Economics	Karppinen (2005)
	Academy of Management Journal	Cordano and Frieze (2000)
	Journal of Economic Psychology	East (1993)
	Journal of Environmental Management	Beedell and Rehman (1999)
Marketing	Journal of International Consumer Marketing	Ferdous (2010)
	Journal of Consumer Marketing	Kalafatis et al. (1999)
	Journal of Marketing	king et al. (2008)
Finance	Strategic Management Journal	Stevens et al. (2005)
Human Resource Management	Contemporary Economics	Ajzen et al. (2011)
	Journal of Career Development	Dam et al. (2009)
	Journal of Occupational and Organizational Psychology	Giles and Rea (1999)
	Journal of Organizational Behaviour	Breukelen et al. (2004)
Discipline	Journal	Refereed Articles
	Tourism Geographies	Zhang et al. (2006)
	Tourism Management	Quintal et al. (2010)

Tourism	Annals of Tourism Research	Bamberg et al. (2003)
	Basic and Applied Social Psychology	March and Woodside (2005)
Medical Science	Psychology and Health	Bish et al. (2000)
	AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV	Hadera et al. (2007)
Education	Journal of Teaching in International Business	Presley et al. (2010)
	Ethics and Behaviour	Harding et al. (2007)
Religious Studies	New Media and Society	Lee and Hameed (2008)
	International Journal of Commerce and Management	Alam and Sayuti (2011)

Table 3.1 portrays how TPB has been applied in a wide variety of disciplines. Various theories (e.g. attribution theory, behavioural decision theory, self-determination theory and theory of planned behaviour) have been substantially used in logistics and SCM research; for example, TPB has been applied in the context of logistics, such as reverse logistics by Rhodes et al. (2014) to predict depot specialty recycling in a community. According to the study findings of Cetin and Sarkar (2013), the top three logistics journals, the *International Journal of Logistic Management*, *International Journal of Physical Distribution and Logistics Management* and *Journal of Business Logistics*, have published 6.4 per cent of their content that apply behavioural theories in logistic and SCM research. This result is similar to the finding of Defee et al. (2010) that social psychological/ behavioural theories account for 2.8 per cent and 6.1 per cent of total theories both in logistics and SCM disciplines respectively. The application of behavioural theories in the 3PL context has attracted less attention so far. The exception is the study by Plant (2009) who applied TPB to evaluate the attitudes, subjective norms and perceived behavioural control of road freight operators, and potential barriers to supply chain collaboration.

The studies that apply TRA and TPB in the organisational decision-making context in different disciplines can be grouped into three broad categories (Southey, 2011): financial decision making (East, 1993, Tuten and Urban, 1999, Solocombe, 1999) strategic decision making (Carpenter et al., 2003, Cordano and Frieze, 2000, Mykytyn, 1993) and professional decision making (Felton et al., 1995, Godin et al., 2005, Marquardt and Hoeger, 2009,

Stevens et al., 2005). These include a diverse set of issues related to investment decisions, employee expectations and satisfaction in the workplace, the formation of green strategies by a firm, pollution reduction, career choices and managerial decisions (Southey, 2011); however, little research is evident in the context of the 3PL decision-making process that utilises behavioural theories.

Considering its widespread applicability, popularity and strong empirical support to predict a wide range of behaviours in different disciplines, this research decided to use the theory of planned behaviour (Ajzen, 1985) as the theoretical framework for modelling the intention to use 3PL services. The three key reasons to use TPB are:

- The application of TPB in the 3PL context is a new area of research because there has been no previous research attempt to estimate the impacts of attitude, subjective norms and perceived behavioural control combined on the intention to use 3PL.
- The TPB is able to identify salient beliefs (such as behavioural, normative and control beliefs) related to 3PL that contribute to the three predictor variables (attitudes, subjective norms and perceived behaviour control).
- TPB allows the identification of the relative strength of each predictor (attitude, subjective norms and perceived behavioural control) impacting on relationships with intention to use 3PL.

3.3 EVOLUTION OF TPB RESEARCH

It has been almost 30 years since the theory of planned behaviour developed. In the course of this time the theory has undergone several modifications in terms of theory and methodology. Adapting the research framework of Lee et al. (2004), this section depicts the progress of TPB, from its introduction to the present day; it is based solely on the extensive literature review undertaken by the researcher while studying TPB. The discussion of the evolution of TPB research is divided into four phases: introduction, growth, maturity and elaboration (Figure 3.4).

3.3.1 Introductory phase

The introductory phase can be characterised as the phase of replication of previous TPB studies and comparisons of TPB with other behavioural theories. In one stream of TPB

research, a substantial effort has been made in different contexts to determine what factors contribute to intention–behaviour relationships and what belief items are related to attitude, subjective norms and perceived behavioural control. In another stream, the researchers have tried to make a comparative analysis of contemporary behavioural theories: for example, Madden et al. (1992), in comparing TRA and TPB, find that the inclusion of perceived behavioural control enhances the prediction of intention and behaviour. Taylor and Todd (1995) compare the technology acceptance model (TAM), TPB, and revised TPB through a longitudinal study of 786 students who used a computer information resource centre; they found that revised TPB and TPB gives a better explanation of behavioural intention than TAM.

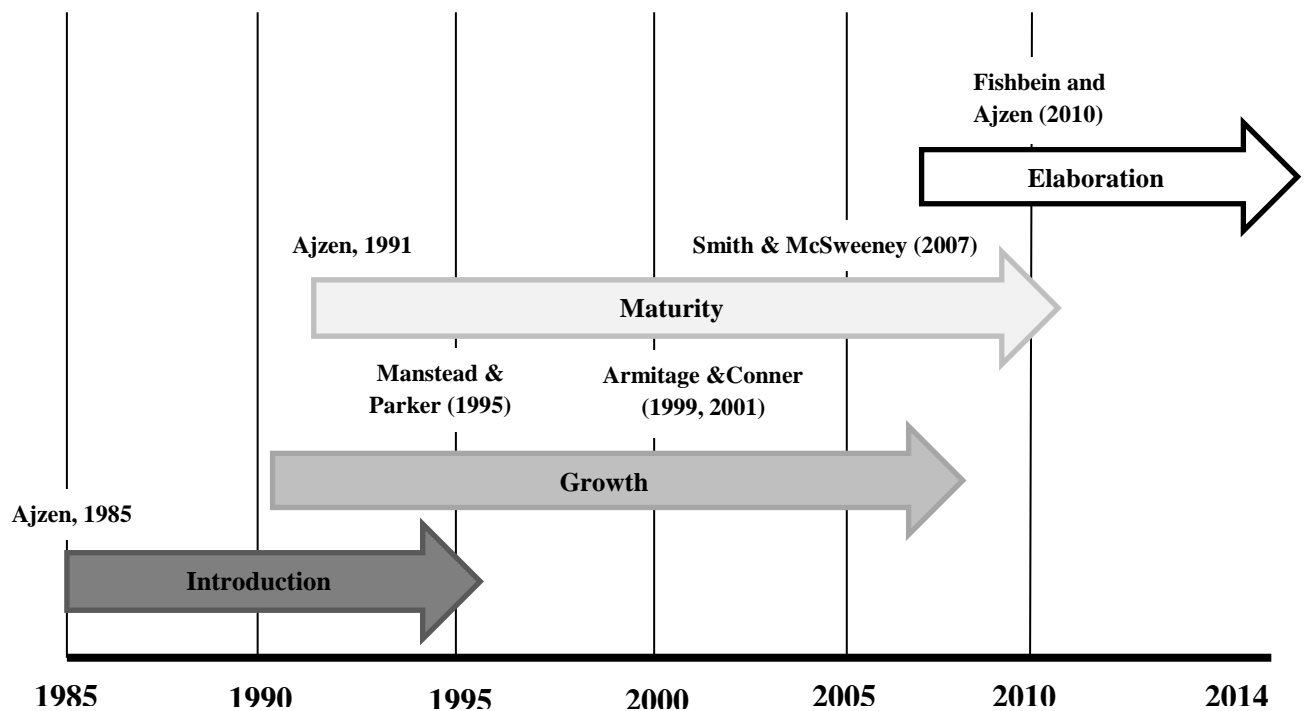


Figure 3.4: Evolution of TPB research, Source: Adapted from Lee et al. (2004)

In a meta-analysis, Sutton (1998) evaluates the performance of both TRA and TPB in predicting and explaining intention and behaviour. Results indicate that TPB explains on average 50 per cent of the variance in intention and between 19 and 38 per cent of the variance in behaviour. On the basis of TPB studies to the end of 1997, Armitage and Conner (2001) report that TPB accounts for 27 and 39 per cent of the variance in behaviour and intention respectively. Results also suggest that TPB accounts for 11 per cent more of the variance in self-reported behaviour than of behaviour measured by observation or actual

behaviour. Although during this period many issues related to TPB were unresolved, it is evident that in combination with perceived behavioural control, TPB can account for a considerable proportion of variance in behaviour.

3.3.2 Growth phase

The growth phase of TPB was mostly dominated by an effort to validate the idea that TPB framework permits the prediction and understanding of particular behaviour in specified contexts. A considerable number of studies were conducted to confirm that TPB uses accurate measurements to deal with the complexities of human behaviour. There has always been uncertainty regarding the exact relationship between the beliefs items (behavioural, normative and control) and the TPB constructs (attitude, subjective norms and perceived behavioural control). Armitage and Conner (1999) conducted a study to investigate the predictive validity and casual ordering of direct and indirect constructs of TPB which indicated good internal and test-retest reliability of the assessed constructs.

The unitary concept of perceived behavioural control was questioned by many researchers in this phase. Some argued that TPB should consider the difference between self-efficacy (Bandura, 1977) and perceived control (Terry and O'Leary, 1995, Armitage and Conner, 2001). Rather than asserting a difference between self-efficacy and perceived control, some researchers like Trafimow et al. (2002) and Sparks et al. (1997) investigated the distinction between the perceived ease or difficulty of performing a behaviour and control over its performance. Not all these efforts are beyond criticism: for example, a methodological problem is found relating to the effort to distinguish between perceived self-efficacy and perceived control. Moreover, measures of perceived ease or difficulty of behavioural performance are claimed to be problematic (Fishbein and Ajzen, 2010). In criticising the previously proposed distinctions of PBC, Fishbein and Ajzen (2010) suggest perceived capacity and perceived autonomy as two measurements of PBC. It is claimed by them, that both perceived capacity and autonomy represent aspects of self-efficacy and perceived control at the same time, but are not separate indicators of self-efficacy or perceived control. There is very high internal consistency in the measurements of items of perceived capacity and autonomy, even when the items of measurement are loaded on separate factors.

Some studies in this phase tried to relate internal sources of control (e.g. skill, willpower) and external sources (e.g. other's interference, task demanded by others) with perceived capacity

and perceived autonomy respectively (Terry and O’Leary, 1995, Manstead and Van-Eekelen, 1998), but this is not consistent with the self-efficacy (or perceived capacity) concept of Bandura (1977) in which self-efficacy is not restricted to internal beliefs only. The literature indicates that both capacity and autonomy are conceptually independent of internal and external sources of control: for example, one may believe that she is able to (capacity) use organic skin care products because she has familiarised herself with the product’s features (internal factor) or because organic products are readily available (external factor). Similarly, she may believe that she has complete autonomy in relation to using skin care products because she has strong willpower (internal factor) or because the skin care companies provides lots of information regarding the ingredients of skin care products (external factor).

Despite some controversy, it can be argued that TPB instruments were found to be powerful, consistent, reliable and valid in different contexts (Ajzen, 1991), but significant methodological and theoretical issues remain to be resolved (Manstead and Parker, 1995).

3.3.3 Maturity phase

The maturity phase of TPB can be characterised as the supplement of the model validation period, where the sufficiency of TPB has been investigated by incorporating external variables (e.g, past behaviour, trust, habit, norms and self-identity) in the original model. Ajzen (1991, p. 199) rightly suggests that ‘if further predictors can be identified, TPB is open to expansion’. Table 3.2 provides a representative list of diverse external variables that affect attitudes, subjective norms, perceived behavioural control, intention and behaviour, and their relationships throughout the TPB literature.

Many studies that used TPB to predict behavioural intention also explored predictors of intention apart not mentioned in TPB: for example, Shim et al. (2001) examined the impact of previous purchase experiences on the intention to use the internet for shopping. Their results exhibit a strong and direct effect of past experience on the intention to use the internet for shopping. Forward (2009) finds that past behaviour and descriptive norms make a unique contribution to the prediction of a driver’s intent to break driving rules. In a field experiment, Verplanken et al. (1998) investigation of repeated behaviour in the domain of travel mode choices argues that habits set boundary conditions for the applicability of TPB. They found that compared with the control participants, the behaviour of the experimental participants

were more strongly related to their previously expressed intentions; however, the habit-behaviour relationship remained same.

Table 3.2: A list of external variables used in TPB

Variable	Refereed Article
General attitudes and personality	Schifter and Ajzen (1985)
Past behaviour	Ajzen (1991);Smith and McSweeney (2007)
Anticipated regret	Sheeran and Orbell (1999)
Self-efficacy	Armitage and Conner (1999); Hagger and Chatzisarantis (2005)
Habit	Verplanken et al. (1998);Forward (2009); Honkanen et al. (2005);Godin and Gionet (1991)
Self-identity, social identity, group norm and group conformity, face saving	Terry and O’Leary (1995); Fin and Kang (2011)
Moral norm, role of price	Godin et al. (2005); Smith and McSweeney (2007), Jiang and Rosenbloom (2005); Zeller (2011); Liao et al. (2007)
Customer satisfaction	Jiang and Rosenbloom (2005); Liao et al. (2007)
Anticipated emotions and desires	Perugini and Bagozzi (2001)
Injunctive and descriptive norms	Smith and McSweeney (2007); Hagger and Chatzisarantis (2005)
Affective and instrumental attitudes	Hagger and Chatzisarantis (2005); Rhodes and Courneya (2003)
Commitment and conscientiousness	Ajzen et al. (2009)
Age, gender	Forward (2010); Castanier et al. (2013)
Social norms	Paris and Broucke (2008)
Moral attitudes	Arvola et al. (2008)
Perceived usefulness, perceived ease of use, trust	Liao et al. (2007); Pavlou and Fygenson (2006)
Social pressure, perceived effectiveness	Zeller (2011)
Role of knowledge/information accuracy	Ajzen et al. (2011)

The contribution of trust to behavioural intention is evident in different studies (Pavlou, 2002, Wu and Chen, 2005). Lin et al. (2009) investigate the relationship between trust and online use intentions. They give an overview of trust and other affective variables like reputation and agreement to fully delineate the relationship between e-trust and online auction use intention.

Other studies hypothesise trust as the common antecedent of TPB. Bandura (1986) and Davis et al. (1989), consider trust as a direct influencer that determines people's attitudes toward behaviour. Pavlou (2002) mentions that trust can increase perceived behavioural control in the context of online transactions.

Along with past behaviours, norms and habits, researchers also investigate the role of self-identity, social identity and group norms in the theory of planned behaviour (Terry et al., 1999). This indicates that a number of external variables were introduced into TPB to examine their different roles in predicting behavioural intention and behaviour as well as check its validity in different contexts.

Apart from including external variables in TPB, the research in this phase also argued for including the subcomponents of predictor variables: for example, Fin and Kang (2011) decomposed perceived behavioural control (PBC) (originally conceived by Ajzen as a single factor) into two factors, internal PBC and external PBC to measure the purchase intention of Chinese consumers toward a US brand of apparel. Although the subjective norm was originally considered a single predictor of intent in the TPB model, Cestac et al. (2014) distinguish it as injunctive and descriptive subjective norms. They argue that both injunctive and descriptive subjective norms are important predictors of risk behaviour. Overall, this phase of TPB research validated the idea that TPB is open for the inclusion of external variables, and argued for the inclusion of subcomponents of the original TPB variables.

3.3.4 Elaboration phase

This period can be characterised as the expansion of the TPB model that synthesised previous effects and tried to resolve limitations and loopholes identified in previous studies. With a few changes and considerations, Fishbein and Ajzen (2010) developed the current theoretical approach to predict and change human behaviour, which they named 'the reasoned action approach' (Figure 3.5). In comparison with TRA and earlier forms of TPB, the reasoned action approach takes into account finer distinctions of the three original determinants of behavioural intention. Attitude is distinguished as cognitive or affective in nature, perceived norms as injunctive and descriptive, and perceived behavioural control as capacity and autonomy. Along with perceived behavioural control, actual control (e.g. skills/abilities and environmental factors) is considered to influence intention-behaviour relationships both directly and via perceived behaviour control. New to this model, background factors such as

general attitude, personality and demographic factors are also included, as relevant for understanding the origins of behavioural, normative and control beliefs concerning a given behaviour.

A revised model that incorporates two subcomponents within each construct of TPB has been widely supported (Rhodes and Courneya, 2003). Hagger and Chatzisarantis (2005) introduce second-order latent factors to explain relationships between the differentiated components of the TPB constructs. In their study a higher-order model takes into account affective and instrumental attitudes, injunctive and descriptive norms, and perceived controllability and self-efficacy as differentiated components of the core TPB constructs of attitude, subjective norms and perceived behavioural control respectively. Results of the study indicate no substantial differences in the fit indices across the first- and second-order models. Moreover, the second-order models exhibit the most optimal parsimony-corrected fit indices.

With the review of the development of TPB-related studies across these four phases, it can be seen that TPB has continuously evolved. Although these four phases overlap each other, TPB studies reveal a normal evolution, which includes prolific validation and expansion of the original TPB. The revised TPB not only includes the subcomponents of the original constructs but remains ‘open for inclusion of different background variables’ (Fishbein and Ajzen, 2010, p. 5). In response to the claim by Sniehotta et al. (2014, p. 1) that ‘the time has come to retire the theory of planned behaviour’, Ajzen (2014, p. 6) argue back that ‘the TPB is alive and well and gainfully employed in the pursuit of a better understanding of human behaviour’.

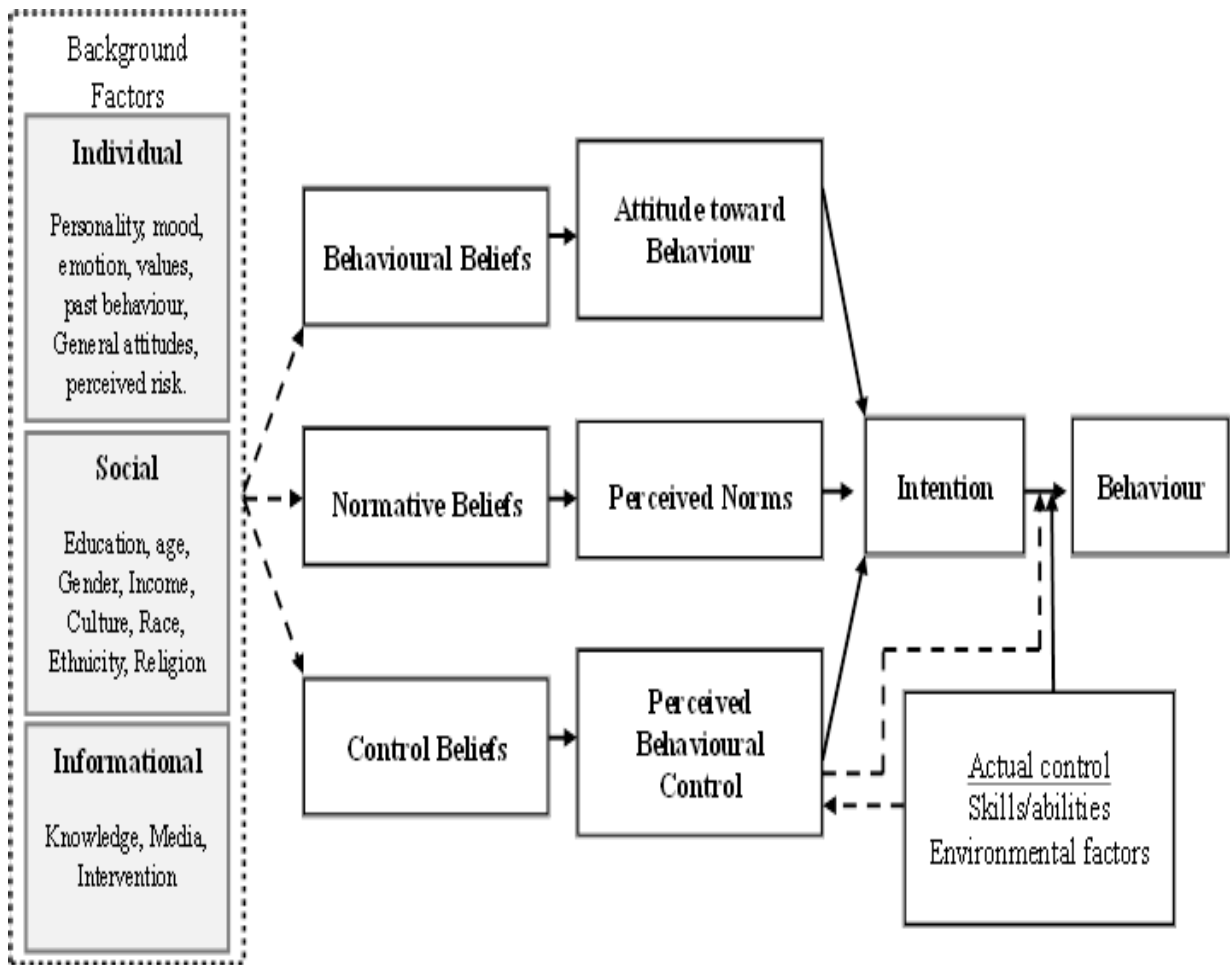


Figure 3.5: The reasoned action approach

Source: Fishbein and Ajzen (2010, p. 10)

3.4 A THEORETICAL FRAMEWORK FOR MODELLING INTENTION TO USE 3PL

The theory of planned behaviour is adopted to develop the modelling framework. The theory does not assume rational decision making; rather, it encompasses both deliberative and unprompted decision making. People's behaviours are assumed to follow a reasonable, consistent and often automatic path which may be inaccurate, biased or irrational (Fishbein and Ajzen, 2010): for example, black is believed to be the colour of death and funerals by some people, who thus avoid the colour when purchasing clothes. The behaviour may be considered irrational and inaccurate, but it is can also be clearly identified as a natural and reasoned behaviour based on someone's beliefs.

TPB requires the behaviours of interest to be defined clearly in a specific context and at a given point of time. A behaviour is composed of four elements (Fishbein and Ajzen, 1975, Ajzen, 2002). These include the action performed, the target at which the action is directed, the context in which it is performed, and the time at which it is performed (TACT). In order to have predictive validity, both the intention and the behaviour must be measured with the same degree of specificity in relation to TACT. The levels of generality and specificity are of four types: a) specific, b) intermediate–low level of generality, c) intermediate-high level of generality, and d) high level of generality. The definition of behaviour can be based on various behavioural criteria such as dichotomy (e.g. performing or not performing the behaviour), frequency (e.g. how often the behaviour is performed) and magnitude (e.g. how much effort is devoted in performing the behaviour) (Fishbein and Ajzen, 2010). This research defines the behaviour of interest on the basis of dichotomies with an intermediate to high level of generality.

Behaviour of interest: Using 3PL services to fulfil the supply requirements of retail business.

Here, (TACT)

Target: 3PL service

Action: use

Context: retail business

Time: always

Upon clear identification of the behaviour of interest, figure 3.6 represents the theoretical framework for modelling intention to use 3PL. No matter how beliefs associated with a given behaviour, it forms the attitude, subjective norm and perceived behavioural control and serves as the guide of the decision to perform or not to perform the behaviour of interest (Fishbein and Ajzen, 2010) According to TPB, behaviour is directly related to behavioural intentions which are, in turn, influenced by three considerations (Ajzen, 1991). First, behavioural beliefs that develop an attitude toward the behaviour, second, the normative beliefs that determine subjective norm and third, control beliefs that determine perceived behavioural control (PBC).

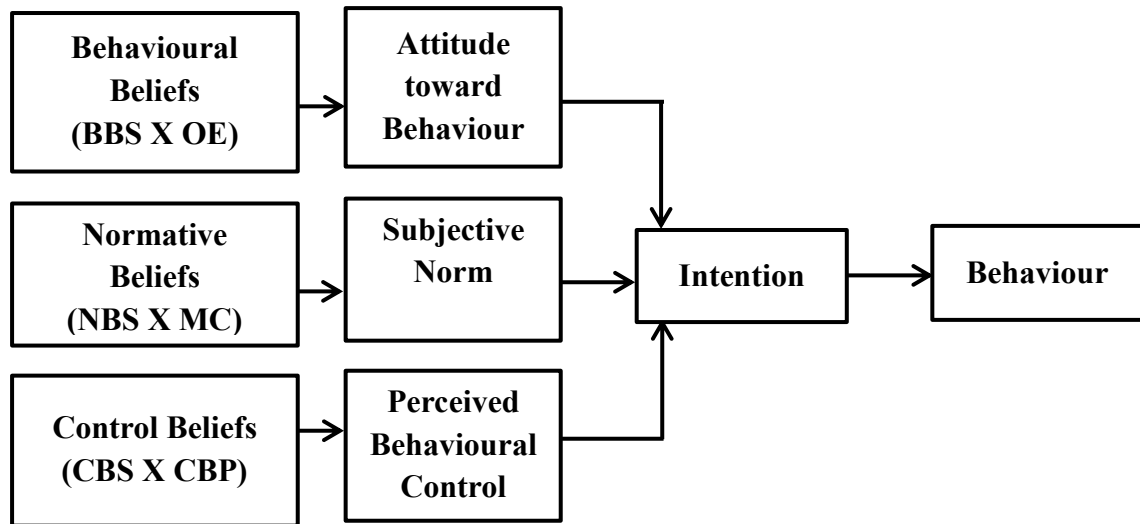


Figure 3.6: Theoretical framework of modelling intention to use 3PL

3.4.1 Predicting intention

Intention is defined as a person's level of readiness to perform the behaviour of interest. Within the TPB framework, intention is based on the individual attitude toward the behaviour, the subjective norms and perceived behavioural control, which are also considered the direct antecedents of behaviour. Although all TPB predictors can be measured by direct questioning, the influence of predictor variables can also be captured indirectly through the responses to questions relating to the each belief measure. Ajzen suggests that prediction of intention and behaviour need to consider both indirect (measurement of beliefs) and direct (attitude, subjective norms and PBC) measures of TPB. Although it is expected that belief-based constructs will be correlated with their respective measures of attitude, subjective norm and perceived behavioural control, they should not be assumed to be the same thing. Belief-based measures are assumed to reflect the foundations of attitude, subjective norm and perceived behavioural control; for example, behavioural belief should explain how and why an individual develops an attitude toward a particular behaviour.

3.4.2 Behavioural beliefs and attitude toward behaviour

Behavioural belief is the subjective probability of performing a behaviour that leads to a certain outcome while attitude toward a behaviour is a function of one's salient beliefs (i.e., behavioural beliefs), which consist of two components: the perceived likelihood of an outcome of the behaviour (belief strength), and the evaluation of the outcome (outcome

evaluation). TPB assumes that having a positive attitude toward a behaviour is based on believing that the behaviour will likely to lead to positive outcomes; thus, likelihood and evaluative judgments are multiplicatively combined [i.e., behavioural belief strength (BBS) \times outcome evaluation (OE)]. If a business customer perceives that the use of 3PL services will lead to faster delivery (OE) it becomes important for the business (BBS) to be responsive to the customer's demands for these services.

3.4.3 Normative beliefs and subjective norms

Normative beliefs are described as the behavioural expectations of other people, or groups of people (e.g. friends, family, co-workers), who are important to the individual (Ajzen, 2002). The subjective norm is represented as a function of a person's normative beliefs (NB) about what salient referents think he/she should (or should not) do, and his/her motivation to comply (MC) (Ajzen and Fishbein, 1980). In short, normative beliefs are subjective probabilities that particular referents will prescribe/proscribe the performance/non-performance of behaviour. TPB assumes that normative pressures are based on two components which are multiplicatively combined: perceptions of whether specific significant others believe that one should perform the behaviour or not (normative belief strength: NBS) and the desire to comply with the wishes of these significant others (motivation to comply: MC). This implies that a subjective norm is reflected both in perceived social pressure from others as well as in an individual's level of motivation to comply. When business people perceive their management and other business partners to be significant referents, the referents' approval/disapproval of using 3PL services is important for them. In this context, when significant others think using 3PL services is a proper behaviour, the social pressure that the business customers perceive to use 3PL strengthens their motivation to comply.

3.4.4 Control beliefs and perceived behavioural control

Control beliefs consist of two components which are also multiplicatively combined: the perception of the presence/absence of resources/opportunities required to perform a specific behaviour (such as skill, resources and opportunities), and the assessment of the level of importance of such resources/opportunities for the achievement of outcomes (i.e., perceived power) (Ajzen and Madden, 1986, Chang, 1998). Perceived behavioural control is considered a function of control beliefs. A number of studies have demonstrated that people's intention/behaviour is positively influenced by their confidence in their ability to perform the behaviour (e.g., Taylor and Todd, 1995b, Baker et al., 2007, Cheng et al., 2006b). Findings in

these studies imply that when an individual holds little control over the performance of a certain behaviour because of, say, the unavailability of required resources (e.g., funds or time), his/her behavioural intention will be low in spite of having a positive attitude/subjective norm toward the intended act.

3.4.5 Attitude and behavioural intention

Attitude toward behaviour refers to the degree of personal evaluation of any activity in which a person has a favourable or unfavourable desire to perform the behaviour. According to Ajzen (1985), an individual is more likely to undertake a certain behaviour if he/she has a positive attitude toward it. When determining whether to perform a specific behaviour or not, a person is likely to assess the resulting benefits and costs (Cheng et al., 2006a). An individual tends to possess a favourable attitude when the outcomes are considered positive and, thus, is likely to engage in that specific behaviour (Ajzen, 1991, Cheng et al., 2006a). In other words, an individual's positive attitude toward certain behaviours strengthens the intention to perform the behaviour (Ajzen, 1991). The majority of studies that apply TPB to measure intention find a positive correlation between attitude and intention. In this case, attitude toward 3PL services (e.g. their use to fulfil supply requirements in a retail business would be good, productive and satisfying) is positively related to the intention to use 3PL: the more positive the attitude, the greater the customer's intent to use 3PL services to fulfil supply requirements.

3.4.6 Subjective norm and behavioural intention

Ajzen (1991, p. 195) defines a subjective norm as 'the perceived social pressure to perform or not to perform the behaviour'. In other words, a subjective norm is the perceived opinion of significant others (relatives, close friends, co-workers/colleagues, business partners) who influence an individual's decision making (Honkanen et al., 2005). The important role of subjective norms as determinants of behavioural intention is well documented in various contexts in marketing and consumer behaviour (e.g., Baker et al., 2007, Cheng et al., 2006a, East, 1993). Although norms emerge as the weakest predictors of behavioural intention compared with other constructs in TPB, many researchers still use them (often with some modification). Specifically, the adaptation of subjective norms (where they are distinguished as normative or descriptive) in predicting different pro-social behaviour is found to improve explanatory power (Rivis and Sheeran, 2003). Many studies of TPB adopt the distinction between descriptive (whether others are or are not performing the behaviour) and injunctive

(whether other people think someone should or should not perform the behaviour) to study a range of behaviours such as alcohol and tobacco use (McMillan and Conner, 2003) and safe sex (White et al., 1994).

In the logistic context, a business customer's intention can be influenced by pressure or influence from competitors, other suppliers and new environmental opportunities. A business customer may be exposed to large amounts of information through advertisements, business interactions, and observations of experts' views of 3PL use or of business partners who use 3PL services, and their cited benefits and limitations. Specifically, if customers who are not using 3PL perceive that business competitors derive benefits from doing so (descriptive norms), and other businesspeople suggest that they too should use 3PL (injunctive norms), it is more likely that they will increase their intention to use 3PL.

3.4.7 Perceived behavioural control and behavioural intention

Perceived behavioural control (PBC) refers to the extent of one's perceived control over a particular behaviour: that is, the ease or difficulty that a person feels in performing an action (Ajzen, 1991). In particular, perceived behavioural control assesses the perception of how well one can control factors that may facilitate/constrain the actions needed to deal with a specific situation. PBC differs from the concept of perceived locus of control (Rotter, 1996) which refers to the generalised expectancy that control remains stable across situations and actions: on the contrary, PBC usually is found to vary across situations and actions.

In the context of logistics, it may be assumed that customers who have a high degree of perceived capacity (i.e. who are confident of being able to use 3PL services because of a strong will to do so) and perceived autonomy (i.e. who believe that the decision to use 3PL services is completely their own) tend to have stronger 3PL use intention and actual use. From this it can be assumed that an intention to use 3PL providers is likely to be positive when customers perceive they have control in terms of capacity as well as autonomy.

3.5 LIMITATIONS OF TPB

TPB provides a useful conceptual framework for dealing with the complexities of human social behaviour; however, a few aspects remain unresolved and must be considered limitations. The key limitations of TPB are as follows:

- *Uncertain relations between direct and indirect TPB constructs:* A plenitude of research establishes significant relationships between salient belief and its corresponding predictor variables; however, the exact form of these relationships is still uncertain (Ajzen, 1991).
- *Self-reported behaviour:* TPB has been investigated in many studies through self-reported behaviour rather than objectively measured behaviour. Ogden (2003, p. 35) argues that ‘self-reports of behaviour can be contaminated by self-reported cognitions, and the correlation between such cognitions as intentions or perception of control and self-reported behaviour can, therefore, not be trusted’. However, as Ajzen and Fishbein (2004) point out, obtaining objective measures of some behaviours (e.g. contraceptive use, exercise, physical check-ups) are virtually impossible, besides being expensive and time-consuming.
- *Inability to predict organisational behaviour:* There is an argument that the TPB model is not suitable for use in an organisational context because the decision processes in organisations include dynamic, multi-phase, multi-person and multi-departmental interests (Thompson and Panayiotopoulos, 1999, Johnston and Lewin, 1996). While this is particularly likely in large organisations, the criticism has far less weight when applied to a small business, where decisions tend to be the domain of a single individual (Southey, 2011).
- *Non-inclusion of emotional variables:* The theory of planned behaviour is based on cognitive processing and levels of behaviour change. Compared with affective processing models, the TPB overlooks emotional variables such as threat, fear, mood, and negative or positive feelings, assessing them only in a limited fashion.

3.6 SUMMARY

This chapter has presented the genesis of the theory of planned behaviour and justifies the application of TPB for modelling the intention to use 3PL. The historical evolution of TPB indicates that over time the model has been proven a robust framework to predict behavioural intention. This chapter has also identified how behavioural intention is related to its predictors (attitudes, subjective norms, and perceived behavioural control), and how these antecedent

predictor variables are associated with belief constructs. The key conclusions of this chapter are:

- The theory of planned behaviour is designed to predict and explain human behaviour in specific contexts.
- TPB has already been used in different disciplines like marketing, management, operational management, engineering, psychology, and logistics and supply chain management, but little has been done so far in decision making in the 3PL context.
- In almost 30 years of development, TPB has become the most widely used theory to predict behavioural intention in different contexts.
- Intention to use or not to use 3PL can be predicted from business customers' attitudes toward 3PL, their subjective norms and their perceived behavioural control.
- Individuals' attitudes to 3PL, subjective norms and perceived behavioural control are related to appropriate sets of salient behavioural, normative and control beliefs in the context of 3PL.

The next chapter introduces the research methodology and discusses the statistical methods adopted to test the theoretical model empirically and to explore the hypothesised relationships.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

Chapter 4 describes the methodology used to test the theory-driven framework for modelling the intention to use 3PL. This chapter begins with a detailed description of the study context (Bangladesh) to highlight its existing logistics services, infrastructure, challenges and opportunities. This is followed by a discussion of the methodological considerations of this research, including sample design, instrument design, data collection procedures and research hypothesis. A quantitative approach to data analysis is adopted which requires explaining the structural equation modelling method in terms of its choice and the steps involved in the analysis. A discussion of the procedures in examining the measurement instruments' accuracy is also included. The chapter concludes with the discussion of multi-group invariance test procedures and a summary of the chapter findings.

Specifically, this chapter will address the following questions:

- What are the current challenges and opportunities in the logistics environment in Bangladesh?
- What are the different methodological considerations for measuring the intention to use 3PL?
- What statistical technique is used to empirically test the modelling framework?
- How can the validity of the measurement instruments be measured?
- What are the procedures in measuring differences in 3PL intention to use, between users and non-user of 3PL?

4.2 RESEARCH METHODOLOGY

Research methodology is a decision-making process that describes how the research will be carried out. It is a systematic process of understanding where the research fits in the needs of the research with regard to its approach, sampling design, instrument design, data collection and statistical techniques for data analysis. Figure 4.1 portrays a flow chart representing the research methodology, consisting of seven steps; the following section describes those steps sequentially.

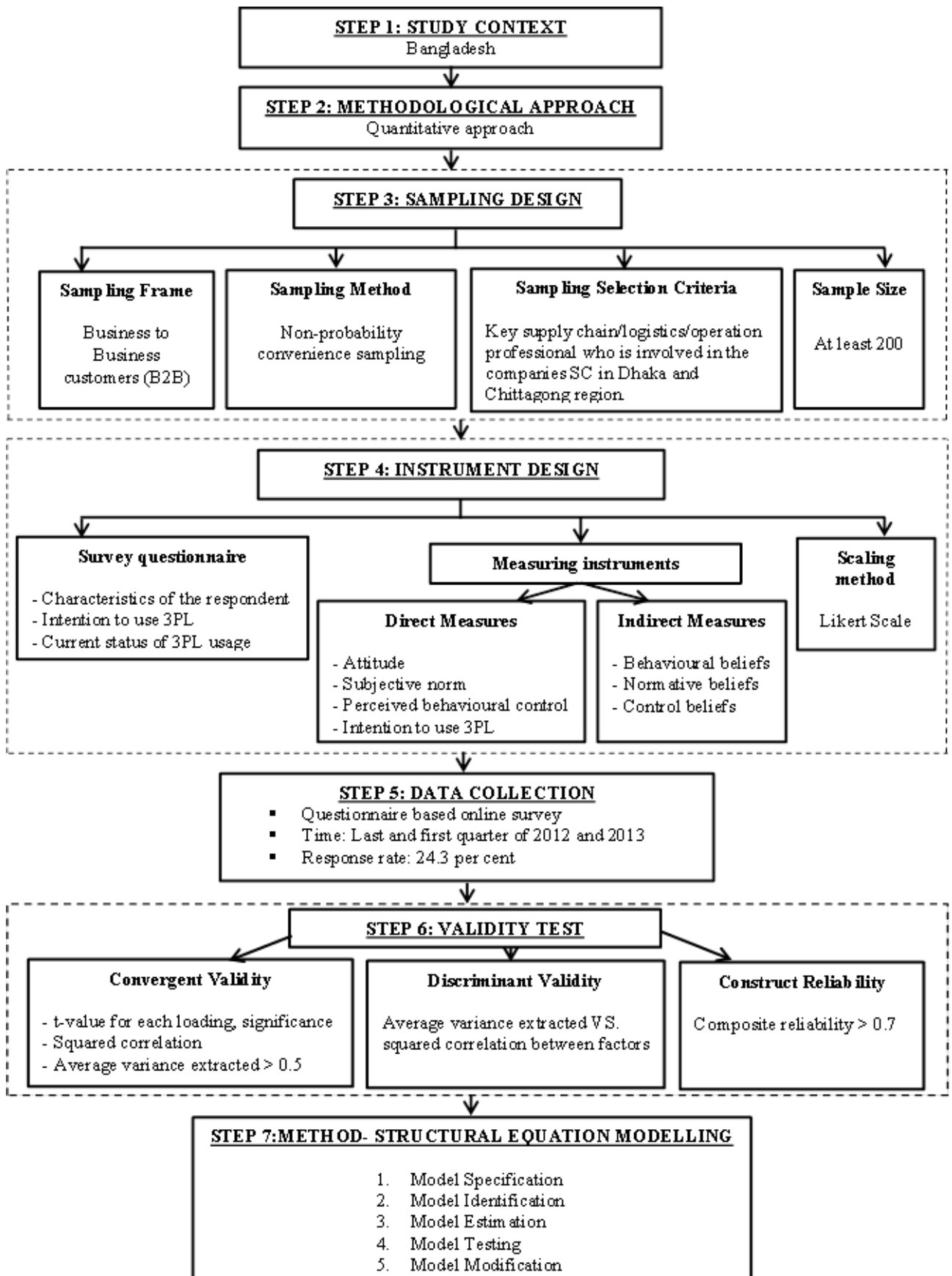


Figure 4.1: Flow chart of research methodology

4.2.1 Study context: logistics environment of Bangladesh

With a population of nearly 150 million (2013 Census Report, BBS) in a nation of 147,570 square kilometres (BNWP, 2015), Bangladesh is among the most densely populated countries in the world. Bangladesh is divided into eight divisions (Dhaka, Chittagong, Khulna, Sylhet, Rajshahi, Barisal, Rangpur and Mymensingh) and 64 districts. Dhaka is the capital city, and Chittagong is the most important port city (Figure 4.2). These two cities are the source of most logistics operations.



Figure 4.2: Map of Bangladesh with major transportation networks

Source: Bangladesh Portal (2015)

4.2.1.1 Logistics services and infrastructure

The logistic companies of Bangladesh, both local and multi-national, offer a set of services such as transportation, warehouse facilities, freight forwarding, custom clearance, packaging, and labelling and distribution. Although there is no consensus about exact statistics, one source of information states that currently there are 36 companies operating as third-party logistics suppliers and exporters, and 12 operating as third-party logistics buyers and importers (TradeFord, 2014). Among them, the Shams Group has been a pioneer and leader in the fields of shipping and logistics for the past three decades, and one of the biggest asset-based multi-modal logistics service providers in Bangladesh. It also has one of the oldest customs clearance houses and one of the most prominent shipping agency and trading houses (ShamsGroup, 2014). A sister concern of Shams called Synertics has recently committed to offer a full range of 3PL services including warehousing and distribution operations, contract warehousing, public warehousing, order fulfilment and extensive value added services (Synertics, 2014).

The transportation sector and its infrastructure play an important role in the logistics environment of Bangladesh. An efficient transportation infrastructure is fundamental to trade growth because it helps to reduce costs and improve customer responsiveness. The infrastructure in Bangladesh consists of road, railway, water and air transport.

i. Road transportation

The major transportation mode of Bangladesh, roads carry over 80 per cent of national passenger traffic (AsianDevelopmentBank, 2007). The 233 km Dhaka–Chittagong is the main road network connecting Chittagong port with the capital city. It is mostly two-lane (84 per cent), but has some four-lane sections (16 per cent). It is the main transportation corridor, handling about 83 per cent of cargo movement, and is heavily congested and poorly managed. The average time to travel its 233 kilometres is six or seven hours, and the average speed no more than 30 or 40 k/ph. This congestion leads to a longer delivery time, affecting logistics responsiveness (WorldBank, 2012).

ii. Waterways transportation

Waterways transport plays a vital role in the transport sector in terms of its international business. It includes national waterways, inland water transport, ports, ocean shipping and maritime shipping (MOS, 2014). Inland ports handle about 40 per cent of the nation's foreign

trade (Banglapedia, 2006). Bangladesh has only two gateway ports, the Chittagong Port Authority (CPA) and the Mongla Port Authority (MPA); Chittagong is the principle port. Vessels calling here are limited by the approach channel to a maximum length of 186 meters (153 at night) and a draft of no more than 9.2 meters (BangladeshPortal, 2014). The maximum capacity for container vessels is 1,200 twenty-foot equivalent units (TEU). Productivity at the port's container terminal is about 100 to 105 lifts per berth per day, well below the productivity suggested by UNCTAD of 230 lifts per day with ships' gear (MartitimeTransport, 2014). As a result, turnaround time for ships is high (four to five days), whereas in more efficient ports turnaround time is on average one day (Worldbank, 2013). Chittagong is a river port, and ships need to pass through the narrow Karnaphuli River. Container ships larger than 617ft (188m) long cannot do this, so transshipment of containers takes place either in Singapore or in other, larger regional ports (BBC, 2012).

iii. Railway transportation

The Bangladesh railway (BR) network (Figure 4.2) has a 2835-kilometre route and 3900 kilometres of track, but is divided between a meter gauge network in east Bangladesh and a broad gauge network in western Bangladesh, with a dual gauge connection linking the two via the Bangabandhu Bridge (Banglapedia, 2006). Currently there are about 34 freight train movements scheduled every day, travelling an average distance of only 220 km by each train all over the country. BR operates with a fleet of 270 locomotives, 1,300 passenger carriages and 11,000 freight wagons. Most of the freight wagons (7,900) are obsolete 20-foot four-wheelers. There is a need for a substantial increase in locomotives and rolling stock, and for providing priority for container trains as well as adopting a commercial approach to freight transport (WorldBank, 2012). BR has taken a few initiatives to build an extended railway network that will strengthen existing port connectivity. For example, it has signed a memorandum of understanding with China Railway Group to build a 100km line to run from Dohazari via Ramu, near the border with Myanmar, to the coastal town of Cox's Bazar (Briginshaw, 2014); and a tender was issued in 2014 to design and build a 60.4-kilometre, 1676 mm-gauge line linking Khulna division with the Mongla port (Barrow, 2014).



Figure 4.3: Major local and international railway and waterways network

Source: BR (2013)

iv. Air transportation

The principal gateway for air freight is Dhaka Shahjalal International Airport. The size of the air transportation system in Bangladesh is relatively small compared with systems in similar-sized developing countries. The government-owned Biman Bangladesh Airlines is the major carrier (Figure 4.3), handling both passenger and cargo transportation. Products are shipped by air on a combination of scheduled and chartered air freighters as well as on passenger aircraft; passenger planes accounted for about 30 per cent of air freight shipments in 2010. Currently there are nine scheduled freight services. The air cargo terminal has a nominal capacity to handle about 273 metric ton per day, but demand rises above 454 metric ton during peak periods (WorldBank, 2012).

4.2.1.2 Challenges of existing logistics infrastructure

The infrastructures described above adversely affect the logistics network in the country, in terms of both efficiency and responsiveness. There is little need to point out that many challenges are already in place and need to be taken care of urgently:

- i. Congestion, bottlenecks, poorly planned and maintained road infrastructure and urban encroachment all impact on the ability of the road transportation infrastructure to support an efficient and effective outsourcing future.
- ii. Low productivity and lack of investments in port capacity are adversely impacting the country's export growth in an increasingly competitive global market where efficiency and responsiveness have become necessities.
- iii. Bangladesh Railways face continually increasing competition from road haulers and buses. Inefficient operating costs, below-market tariffs and heavy capital and operating subsidy requirements are only some of the major challenges for the railway.
- iv. Airport transportation networks lack the physical capacity and have no appropriate policy governing airfreight services, which are inefficiently managed by the authority. Poorly constructed and managed cargo terminals and the state monopoly of civil aviation add challenging factors to air transport logistics.
- v. The disintegration of ports, railways and inland container depots is another a challenge for logistics which places extra demands on the Dhaka-Chittagong corridor, (the main trade route in Bangladesh), which is inadequate to handle exports and imports.



Figure 4.4 Domestic and international route map of Biman Bangladesh Airlines

Source: (Biman Bangladesh, 2015)

4.2.1.3 Logistics opportunities

Despite those infrastructural challenges, Bangladesh is considered one of the most attractive emerging economies of the near future (WorldBank, 2012). Favourable demographic and

macro-economic trends, high economic growth rates (6.3 per cent in 2012) and a relatively liberal investment climate are some of the opportunities that Bangladesh can offer. Sensible utilisation of these, particularly of export-based industries and investment opportunities, and making the most of its favourable situation can play a key role in Bangladesh's efforts to maintain strong growth in exports and logistics-based industries.

i. Export based industries

Bangladesh, in spite of its dependence on agriculture, has established itself as one an important production point of textile and ready-made garments, with almost all major global apparel brands outsourced to Bangladesh (EPB, 2010). Bangladesh's share of the world garment market has grown from 2.6 per cent in 2000 to 4.3 per cent in 2009 (Mohiuddin, 2011). A second growth industry is the labour-intensive process of ship-breaking for scrap, which has developed to the point that it is meeting most of the domestic demand for steel. Other industries include sugar, tea, leather goods, newsprint, pharmaceuticals and fertiliser production. Exports from Bangladesh have been growing throughout most of the world, and its increase in external trade demands more efficient logistic services (Table 4.1).

Table 4.1: Direction of export from Bangladesh by regions (Million Taka)

Region	Export				
	2006-07	2007-08	2008-09	2009-10	2010-11
North America	269772	288236	-	31418	434702
Central America	4506	5792	6724	872	8206
South America	1811	3024	6264	29661	10717
EEC countries	299832	432704	404433	55124	689704
EFTA (excl.UK)	30197	38873	37962	25197	73966
Eastern Europe	9538	17565	-	17893	20920
Asian Countries	15100	18668	15178	98372	21343
Middle East	298441	39226	25061	58292	87358
African Countries	2640	4298	-	2307	4951
Oceania	15045	20425	6363	15211	19813

Note: (-) not available

Source: adapted from Statistical Yearbook of Bangladesh, BBS (2011)

ii. Favourable foreign investment policies and infrastructures

The Bangladesh Government has enforced several encouraging, highly liberal and proactive foreign investment policies, such as a three- to five-year tax holiday on specific sectors,

sustainable high cost-competitiveness in service sectors, and duty free import of capital machinery (Akter, 2012). Government involvement on some issues such as intra- and inter-country connectivity, export and growth centres facilitating infrastructure, and the Asian highway and Trans-Asian railway network are important contributions to the country's transport strategy (BDFM, 2010). The Government is also in the process of approving the Integrated Multi Modal Transport Policy, which aims to build a secure, dependable and uninterrupted transport network, addressing problems related to road, rail, and inland water transport, including access to ports and airports (Worldbank, 2013). This provides vast opportunities for companies offering logistics services in the country and is good news for export-based industries that may be able to reduce logistics costs and enhance their supply chain efficiencies.

iii. Strategic locational advantage

Bangladesh is located next to India, China and the South Asian Association for Regional Cooperation: all large markets. The country is surrounded by India on the west, north and northeast, and by Myanmar on the southeast, with the Bay of Bengal in the south providing a gateway to the oceans of the world (Figure 4.2). Bangladesh and India share a 4,096-kilometer (2,545-mile) long international border, the fifth-longest in the world (Worldbank, 2013). Geo-strategically and in terms of connectivity with India, the location of Bangladesh is very favourable, although there is also vulnerability in terms of parallel imports, smuggling and political issues. Driven by bilateral trade between India and Bangladesh, non-tariff barriers (NTBs) and geographical proximity, both countries offer markets for each other's exports and have advantages of reduced transaction costs and rapid delivery.

Bangladesh has the potential to become a focal connecting point between the South Asian countries forming the China and the South Asian Association for Regional Cooperation (Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka and Afghanistan) and those in the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (India, Myanmar, Sri Lanka, Thailand, Bhutan and Nepal) (Worldbank, 2013). For example, two landlocked neighbours, Nepal and Bhutan, would like to access the Chittagong port to transport cargo to their countries. If transit agreements between Bangladesh and neighbouring countries are finalised, Chittagong has the potential to become a regional business hub. (BBC, 2012). A proposed trade route referred as the Bangladesh–China–India–Myanmar trade corridor, would begin in Kunming in China and lead west for 2,800 kilometres before ending

in India (GoKunming, 2014). These opportunities indicate that Bangladesh could be a lucrative market for outsourcing by capitalizing its locational advantage and developing its existing logistics infrastructure.

4.3 METHODOLOGICAL APPROACH

There are two general approaches to gathering and reporting information: qualitative and quantitative. The qualitative approach focuses on describing a phenomenon in a deep and comprehensive manner. The quantitative approach, on the other hand, focuses on describing a phenomenon across a larger sample, providing the possibility of identifying characteristics across groups or relationships. This research adopted a quantitative approach for data collection and testing the theoretical modelling framework for three key reasons. First, it can test the hypothesised relationships between sets of variables in numbers in an objective way (Blaikie, 2010, Hair et al., 2007). Second, it is not only able to the questions such as ‘what are the factors influencing 3PL decisions but also can assess the extent to which the factors influence 3PL decisions. Third, it helps to generalise results within a broader context (Creswell, 2003, Morgan, 1998, Tashakkori and Teddlie, 1998).

4.4 SAMPLE DESIGN

Sample design is the process of selecting a sample of respondents who typically represent the target population. There are four interrelated considerations of what constitutes a representative sample: sample frame, sampling method, selection criteria and sample size.

4.4.1 Sample frame

Sample frame is the source (e.g., population) from which a representative sample is drawn. The population of this study is business customers, which includes manufacturers, retailers, suppliers and other intermediaries in the business-to-business (B2B) process. The population of this study could be any entities involved in any type of business process.

4.4.2 Sampling method

Sampling method is broadly categorised as probability sampling or non-probability sampling. A probability sample is a sample in which every unit in the population has a chance of being selected, and this probability can be accurately determined. Nonprobability sampling is any sampling method where some elements of the population have no chance of selection and the probability of selection cannot be accurately determined. Nonprobability sampling is

criticised for its inability to draw inferences in regard to the entire population; however, it is recommended for use in situations where identification of the representative sampling of population difficult and highly expensive (Blaikie, 2010). Moreover, the non-probability sampling method can be of different types, such as convenience and quota sampling. In quota sampling, the population is segmented into mutually exclusive sub-groups and the sample is selected on the basis of selection criteria such as age, gender and region. In convenience sampling, the sample is drawn from that portion of the population which is close to hand. Since there is no current and comprehensive database of companies available in Bangladesh, and the population could be any business customers, and these customers are difficult to identify, this research adopted a non-probability sampling method based on convenience.

4.4.3 Sample selection criteria

The target population of this study represents the business organisations of Bangladesh who are registered in the federation of Bangladesh Chambers of Commerce and Industry (FBCCI). A key supply chain/logistics/operation professional from those organisations was approached to participate in the study. As most of business and economic activities revolve around Dhaka and Chittagong, companies in these two major cities were selected as respondents.

4.4.4 Sample size

The final sample size decision was made on the basis of the statistical technique, structural equation modelling (SEM), employed for analysing the data. In SEM, the proposed guidelines for the sample size depend on the multivariate normality of data, estimation technique, and model complexity. One study recommends 200 as a critical sample size for SEM estimations (Weston and Gore, 2006), and other studies suggest that a sample size of 400 or more would be sensitive to the estimation and goodness-of-fit measure and could suggest poor fit (Byrne, 2009). Considering the disagreement regarding sample size in relation to SEM analysis, it was decided to contact 1000 organisations with the aim of getting a target sample of at least 200 respondents.

4.5 INSTRUMENT DESIGN

Considering the various constructs of the modelling framework, a survey questionnaire was designed to collect the data for this study. The discussion of instrument design includes the survey questionnaire, measuring instruments and the scaling method.

4.5.1 Survey questionnaire

The questionnaire is divided in three broad sections. The first part focuses on the characteristics of the respondent organisation, the second on the current use of 3PL, and the third on the intention to use 3PL. Questions relating to the intention to use 3PL are in two sections: the first contains questions of predictor constructs (attitudes, subjective norms and perceived behavioural control) and 3PL use intention measures, and the second consists of items designed to assess belief constructs. The questions relating to current use of 3PL is divided into three parts: a) the extent of current 3PL use, b) impact of the use of 3PL services, and c) the 3PL decision-making process. The rationale behind including questions related to current 3PL practices is that there is a lack of literature on the 3PL industry in Bangladesh. Specifically, there has been little research into practices relating to the extent of 3PL usage, 3PL decision-making processes and the impact of 3PL. To help fill this gap a quantitative investigation was undertaken in order to enhance the literature and begin a knowledge base for developing 3PL practices in the country.

4.5.2 Measuring instruments

Along with predicting the intention to use 3PL services, the aim of this research is to identify the salient beliefs that contribute to the three predictor variables of the intention to use 3PL. Thus, both direct and indirect measures of the theory of planned behavior (TPB) are included as measuring instruments.

4.5.2.1 Indirect measures

Salient belief constructs are considered indirect measures of TPB. These include, behavioural, normative, and control beliefs. The measurement items for salient behavioural beliefs and control beliefs, and their referents, were developed from a review of the literature and an elicitation study, which was conducted in this research before collecting the data. Ajzen and Fishbein (1980) and Ajzen (1991) indicate that a new set of beliefs and salient referents should be elicited for each new context and population. People can hold many beliefs about any given behaviour, but they can attend to only a relatively small number at any given moment (Ajzen, 1991); thus, a small sample (25 respondents) is taken from the target population from which the data are collected.

An open-ended questionnaire was sent to the small sample (e.g., logistic professionals) to elicit their commonly held beliefs regarding 3PL. On the basis of the respondents' replies, a content analysis was conducted, providing 17 items of belief strength components (behavioural belief strength: BBS; normative belief strength: NBS; control belief strength: CBS), and 17 items of evaluative components (outcome of evaluations: OE; motivation to comply: MC; and control belief power: CBP). The salient referents were company management, business partners (e.g., suppliers, and retailers) and other business people (e.g., direct/indirect competitors). The refinement of the questionnaire was made after experts' reviews. The results of a subsequent pilot test using 25 logistic professionals and two logistics experts revealed that the instruments had an adequate level of reliability and face validity. On the basis of the retuned open-ended questionnaires and expert views, a set of indirect measures was developed related to behavioural, normative and control beliefs.

4.5.2.2 Direct measures

Following the modelling framework, this study included five constructs which are considered direct measures of TPB: attitude toward 3PL use, subjective norms, perceived behavioural control, 3PL use intention and actual 3PL use. This study adopted existing validated items to assess these direct measures (e.g., (Ajzen and Fishbein, 1980, Millen et al., 1997). The wording of the measures was modified to make it suitable for the study's context (Appendix 1).

4.5.3 Scaling method

The choice of scaling system can have substantial implications in TPB (Ajzen, 1991). After almost 30 years of application of TPB in different contexts, there is still debate on which beliefs' scaling is best. A researcher can chose among different options: for example, when measuring behavioural beliefs a researcher can choose among three options like (a) bipolar (-2 to +2) BBS and OE; (b) unipolar BBS (1–5) and bipolar OE; and (c) unipolar (0–4) BBS and bipolar OE (Ajzen, 1991). All of these options have their corresponding advantages and disadvantages. This research used only a unipolar 1–7 point Likert scale (for both arms of the belief constructs) for the sake of respondents' ease of understanding and to increase the likelihood that all questions will be answered. Direct constructs are all measured using a 7-point Likert scale (1=strongly disagree, 7=strongly agree). Multi-item scales are used to measure these variables so that they can adequately capture the domain of constructs (Vandenberg and Lance, 2000, Byrne, 2009). Most of the questions relating to the current use

are presented in multiple choice question formats, but questions pertaining to the impact of using 3PL services and the advantages and disadvantages of 3PL usage were developed so that the responses were given on a five-point Likert scale and rank order scale respectively (Appendix 2). The survey instruments relating to the current use of 3PL were developed on the basis of previous studies by Bhatnagar et al. (1999) and Sahay and Mohan (2006) .

4.6 DATA COLLECTION

The questionnaire-based online survey approach was adopted to collect data for this study. The rapid rate of internet penetration among the target population and the advantages (e.g., cost savings, easiness and more accuracy in data imputation) of online data collection were the reasons for using online data collection procedures. Internet penetration in Bangladesh recently stood at 20.65 per cent (BBS, 2011) and is largely driven by the rapid expansion of a countrywide internet network and prudent regulatory support. This percentage of internet penetration compares very well with SAARC countries and other countries such as Indonesia and Thailand (BBS, 2011).

During the last and first quarter of 2012 and 2013, the survey was administered. A list of 1000 organisations was selected randomly as respondent companies. Initially an email was sent to the companies' contact person, to collect the email address and phone number of the key personnel responsible for supply chain/logistics operations. Once this was obtained, an email containing a link to the survey questionnaire was sent to the relevant address. The respondents were requested to fill out the questionnaire in a way that best captured the current 3PL practices of their organisation and their intention to use 3PL. The questionnaire design included a skip pattern, whereby respondents were instructed to skip sections with questions that were not applicable to them. For example, respondents who were non-user of 3PL services were directed to provide only the basic information and intention part of the questionnaire.

A total 251 responses were received, of which eight were incomplete and discarded for further analysis. The missing data in these eight followed no specific pattern, but seemed to be randomly missing. This resulted in 243 usable responses, a response rate of 24.3 per cent comparable with 3PL studies conducted both in developed and developing countries (Sahay and Mohan, 2006, Dapiran et al., 1996, Bhatnagar et al., 1999).

4.6.1 Respondents' profiles

The respondents of this study came from a wide variety of industries, categorised under 14 industry classifications such as garments and textile, telecommunications, pharmaceuticals, cement and ceramics, agro-business, frozen foods, transportation, banking and financial institutions, information technology, health services, media services, real estate, tourism, and education. The majority of the respondents were from telecommunications, pharmaceuticals, banking, and the garment and textile industry (Figure 4.1). For convenience, the fourteen selected industries are broadly categorised into two: manufacturing and service industries. These two respectively represented 45 per cent and 55 per cent of respondents.

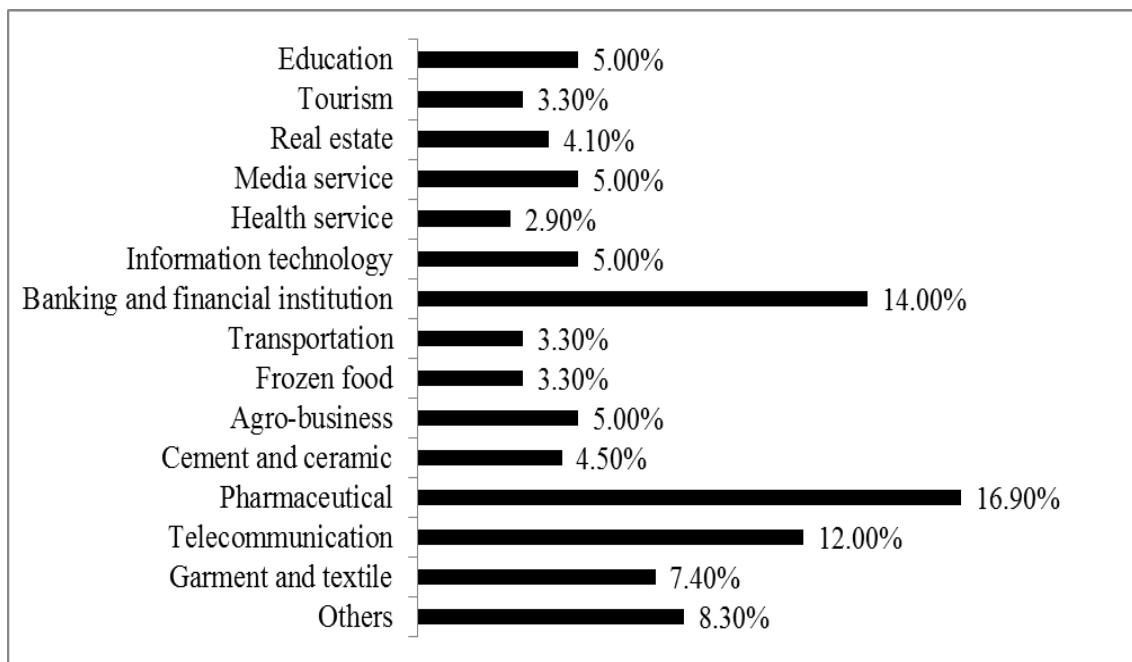


Figure 4.5: Classification of respondents by industry

The majority of the respondents were male (76 per cent; female 24 per cent) and fell in the age range of 31-40 years (45 per cent of respondents); 58 per cent of the total respondents had a postgraduate level of education, which indicated their fair understanding of the survey questionnaire which was in English. It is noteworthy to mention that, English-medium education system is most prevalent in higher studies in Bangladesh.

4.7 HYPOTHESES

The hypotheses underlying this research are developed on the basis of relationships between constructs which are discussed in Chapter 3. Based on the theoretical framework of the theory of planned behaviour (Figure 4.2), the following eight hypotheses are proposed:

- H1** BBS X OE has a positive influence on attitudes toward 3PL (where BBS is the belief that performing the behaviour has consequences; OE is the evaluation of the consequences).
- H2** NBS X MC has a positive influence on subjective norms (where NB is the belief that an important referent thinks the behaviour should be conducted; MC is the motivation to comply with the referent).
- H3** CBS X CBP has a positive influence on perceived behavioural control (where CBS is one's perception of the presence/absence of resources/opportunities required to engage in the behaviour; CBP is one's assessment of the significance of the resources/opportunities).
- H4** Attitudes toward 3PL have a positive influence on the intention to use 3PL.
- H5** Subjective norms have a positive influence on the intention to use 3PL.
- H6** Perceived behavioural control has a positive influence on the intention to use 3PL.
- H7** The intention to use 3PL has a positive influence on actual 3PL use.
- H8** The intention to use 3PL does not vary between users and non-users of 3PL services.

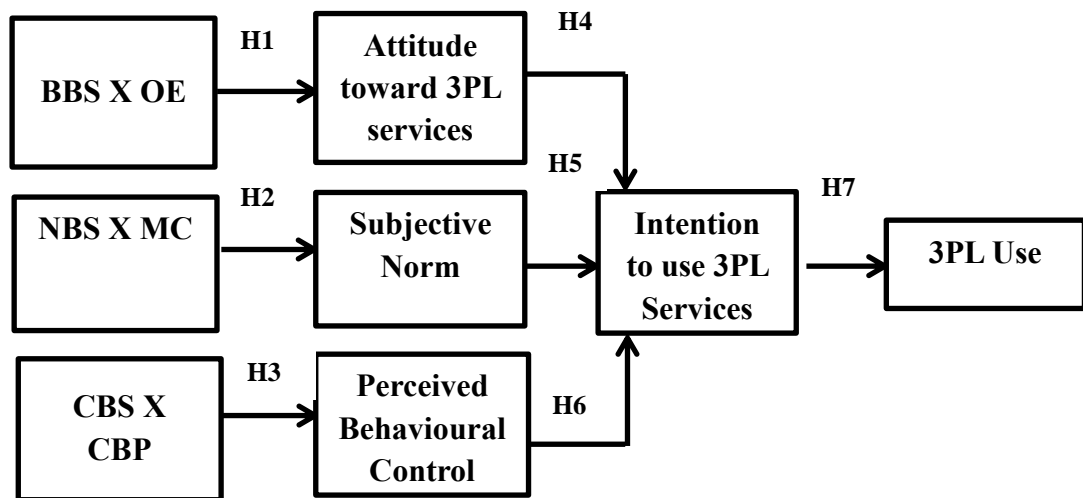


Figure 4.6: Modelling the intention to use 3PL

4.8 METHOD: STRUCTURAL EQUATION MODELLING (SEM)

Structural equation modelling is a statistical technique that seeks to explain the relationships among multiple variables. Relationships under study are represented by a series of structural/multiple regression equations. The structural equations are expected to be modelled pictorially to enable a clear conceptualisation of the theory. The hypothesised model can then be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data. If goodness-of-fit is adequate, the model supports the

credibility of hypothesised relations among variables; if it is inadequate, the tenability of such relations is rejected (Byrne, 2001).

4.8.1 Why structural equation modelling?

Several aspects of SEM set it apart from the other multivariate statistical techniques. First, it examines the structure of interrelationships that can be expressed in a series of equations, which is similar to a series of multiple regressions. In comparison with more conventional statistical methods such as path analysis and multiple regression analysis, a major advantage of structural equation modelling is that each latent factor captures the shared variance among its indicators and therefore explicitly partials out measurement error (Ryu and Jang, 2006). Second, SEM provides explicit estimates of the error variance of parameters, while traditional multivariate procedures are incapable of assessing and correcting measurement errors. Third, SEM procedures can incorporate both unobserved (latent) and observed variables simultaneously. Fourth, SEM can be used to explore the direct, indirect and total effects of the constructs and their dependent relationships. Fifth, SEM is capable of examining a series of dependence relationships simultaneously (Steinmetz et al., 2009): for example, in this research where it is hypothesised that attitudes form the intention to use 3PL positively, and then intention to use 3PL leads to its use, intention to use 3PL acts as both a dependent and independent variable in a subsequent dependence relationship. This implies that a hypothesised dependant variable becomes an independent variable in a subsequent dependence relationship. None of the traditional multivariate statistical techniques other than SEM make it possible both to assess measurement properties and test the key theoretical relationships in one technique (Hair et al., 2007) at a time. Finally, SEM is the most used statistical technique in studies which have applied TPB to measure the intention of the behaviour of interest.

4.8.2 Basic concepts of SEM

This section focuses on the basic concepts including the definition of variables used in SEM, model symbol, measurement model, structural model, normality of data and outlier, to facilitate the discussion of the results in Chapter 6.

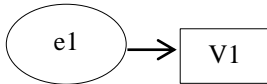
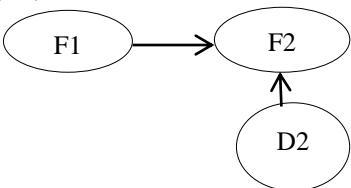
4.8.2.1 Definition of variables used in SEM

Variables in SEM can be of four types: latent, observed, exogenous and endogenous.

- i. A latent variable is one that cannot be observed directly. Phenomena such as customer expectations and employee motivation are two examples of this theoretical construct, which researchers are interested in studying but cannot measure directly due to their abstract nature. In such cases, the researcher must operationally define the latent variable of their study by one or more observed (indicator) variables.
- ii. An observed variable can also be termed a measured variable (MV), one that is directly measured. It can be obtained either from respondents in response to questions (as in a questionnaire) or from some type of observation. It is also known as a manifest variable.
- iii. An exogenous latent variable is one that causes fluctuations in the values of other latent variables in the model. It is synonymous with the independent/predictor variable. It is considered to be influenced by factors external to the model. Background variables such as gender, age, and socioeconomic status are examples of such external factors.
- iv. Endogenous latent variables are influenced by the exogenous variables in the model, either directly or indirectly. They are also known as dependent/criterion variables.

4.8.2.2 Symbolic notation of SEM

Structural equation models are schematically portrayed using particular configurations of the following symbols:

- a. Circle (or ellipse \circ) represents unobserved latent factors.
- b. Square (or rectangle \square) represents observed variables.
- c. Single-headed arrow (\rightarrow) represents the impact of one variable on another
- d. Double-headed arrow (\leftrightarrow) represents covariance or correlations between pairs of variables.
- e. Error (e1) associated with measured variable (V1) 
- f. Path coefficient for regression of a latent variable (F1) on an observed variable (V1)
- g. Path coefficient for regression of one latent variable (F1) onto another latent variable (F2), residual error (D2) in prediction of F2 by F1 

4.8.2.3 Measurement model

The measurement model specifies the relationships between the latent and the observed variables. It focuses solely on how, and the extent to which, the observed variables are linked

to their underlying latent factors (Byrne, 2009). The strength of the regression paths from the factors to the observed variables (the factor loadings) are of primary interest in the measurement model testing. Although inter-factor relations are also of interest, any regression structure among them is not considered in this model (Byrne, 2001). The observed variable measurement error is defined as that portion of the observed variable score that is measuring something other than what the latent variable is hypothesised to measure. It serves as a measure of error variance, and hence indicates the observed variable score reliability (Schumacker and Lomax, 2004).

4.8.2.4 Structural model

In contrast to the measurement model, the structural model (also known as full latent variable model) allows for the specification of the regression structure among the latent variables. This implies that the researcher can hypothesise the impact of one latent construct on another in the modelling of causal direction. This model is termed full (or complete) because it comprises both a measurement model and a structural model (Schumacker and Lomax, 2004).

4.8.2.5 Multivariate normality

In general, a critical and important assumption in conducting SEM analysis is that the data should be multivariate normal (Yuan and Zhong, 2013). Statistical research has shown that whereas skewness tends to affect tests of means, kurtosis severely affects tests of variances and covariances (Schumacker and Lomax, 2004). Given that SEM is based on the analysis of covariance structures, evidence of kurtosis is always of concern, particularly the evidence of multivariate kurtosis. A kurtotic situation is one where the multivariate distribution of the observed variables has both tails and peaks that differ from the characteristics of a multivariate normal distribution (Yuan and Zhong, 2013).

4.8.2.6 Outliers

Outliers represent cases whose scores are significantly different from all other cases in a particular set of data. If data have an extreme score on a single variable, this is referred to as a univariate outlier, while a multivariate outlier has extreme scores on two or more variables (Kline, 2005). Computation of the squared Mahalanobis Distance (D^2) for each case is the most widely used approach to outlier detection in SEM. If a case has a D^2 value that stands uniquely apart from all the other D^2 values, it is generally considered an outlier.

4.8.3 Modelling strategy

SEM is flexible in terms of its application, and can be used for achieving many research objectives. According to Hair et al. (2007) researchers can use one of three modelling strategies of SEM:

- ***Confirmatory modelling strategy***

Confirmatory modelling strategy is the most direct application of SEM, specifying a single model composed of a set of relationships. In this strategy, the purpose is to assess how well the model fits the data. This strategy hypothesises that either the model works or it does not.

- ***Competing models strategy***

A competing models strategy is based on comparing the estimated model with alternative models. The aim of adopting this strategy is to test competing models that are truly different, and to identify highly credible, hypothesised structural relationships. This is much stronger than a confirmatory modelling strategy, which is tested in isolation.

- ***Model development strategy***

This differs from the prior two strategies. Although a basic model is tested and compared with other models, the aim of the test is to improve the framework through modification of the theoretically justified model; however, the modifications have to have theoretical support and not just empirical justification.

This research adopted the confirmatory modelling strategy to assess the extent to which the set of relationships in the TPB model fitted the data gathered in the context of 3PL in Bangladesh.

4.8.4 SEM steps

Five building blocks are essential to all SEM models and follow a logical sequence: specification, identification, estimation, testing and modification.

4.8.4.1 Model specification

Model specification refers to the use of relevant theory, research and information to develop a theoretical model. It is considered the hardest part of structural equation modelling (Kline, 2005). Prior to any data collection or analysis the researcher specifies a model, which should be confirmed by variance-covariance data in a later stage. In this regard, researchers can decide about the inclusion and exclusion of variables in the proposed model on the basis of available information (Anderson and Gerbing, 1988).

4.8.4.2 Model identification

Once the measurement model is specified, the next step is to solve the model identification problem. Over-identification is always the desired state for SEM models in general. There are several guidelines that can help to avoid identification problems. Order and ranked conditions are the two basic rules of model identification. For a model, if the degrees of freedom are greater than zero, then it meets order conditions. Traditionally there have been three levels of model identification, depending on the amount of information in the sample variance-covariance matrix necessary for uniquely estimating the parameters of the model. The three levels of model identification are as follows (Hair et al., 2007):

- A model is under-identified (or not identified) if one or more parameters may not be uniquely determined because there is not enough information in the matrix S (Sample covariance matrix).
- A model is just-identified if all the parameters are uniquely determined because there is just enough information in the matrix S .
- A model is over-identified when there is more than one way of estimating a parameter (or parameters) because there is more than enough information in the matrix S .

In general, identification deals with whether enough information exists to identify a solution to a set of structural equations. It is generally satisfied when all factors in a measurement model have at least three significant indicators. Each potential parameter in a model must be specified as a free, a fixed, or a constrained parameter. A free parameter is one that is unknown and therefore needs to be estimated. A fixed parameter is not free but is fixed to a specified value, typically either 0 or 1 (Schumacker and Lomax, 2004). A constrained parameter is unknown, but is constrained to equal one or more other parameters. Model identification depends on the designation of parameters as fixed, free, or constrained (Ryu and Jang, 2006).

4.8.4.3 Model estimation

Model estimation requires the researcher to address the aspects of individual parameter fit, estimation technique and computer programme selected for the analysis. Before testing the model as a whole and its validity, it is important to examine the fit of individual parameters of the model. Three main features of the individual parameters in this instance need to be considered:

- A free parameter needs to be significantly different from zero. A general guideline is to compare the critical value with the expected value. If the critical value exceeds the expected value at a specified level (e.g., 1.96 for a two-tailed test at the .05 level), then that parameter is significantly different from zero (Schumacker and Lomax, 2004).
- The sign of the parameter need to be matched with what is expected from the theoretical model. For example, if the expectation is that more education will yield a higher income level, then an estimate with a positive sign would support that expectation.
- The parameter estimates should make sense: that is, they should be within an expected range of values. For instance, variances should not have negative values and correlations should not exceed the value of 1 (Kline, 2005).

Parameters can be estimated by different estimation procedures such as maximum likelihood (ML), generalised least squares (GLS), and unweighted least squares (ULS). The ULS estimates are free of distributional assumptions or associated statistical tests (Byrne, 2004). Both GLS and ML estimation methods have large sample properties and assume multivariate normality of the observed variables (Bentler, 2006). The weighted least squares (WLS) method generally requires a large sample size, and so is considered an asymptotically distribution-free (ADF) estimator which does not depend upon the normality assumption (Kaplan, 2000).

This research will analyse the hypothesised model by using the maximum likelihood (ML) estimation technique. Upon meeting the assumption of multivariate normality, ML estimation is considered a more efficient and unbiased method of model estimation. Although the sensitivity of ML estimation to non-normality has created alternative estimation techniques, ML estimation continues to be the most widely used approach and is the default in most SEM

programmes, proving fairly robust to violations of the normality assumption (Ryu and Jang, 2006).

Several readily available programmes are convenient for performing SEM. Traditionally the most widely used is LISREL (Linear Structural Relations), which is considered a flexible programme that can be applied in numerous situations like cross-sectional, experimental, quasi-experimental and longitudinal studies (Reisinger and Turner, 1999). EQS (equations) is another widely available programme that can also perform regression analysis, factor analysis and path analysis (Byrne, 2001). AMOS (Analysis of Moment Structures) has gained popularity because of its graphical interface and its inclusion in the SPSS module. It helps researchers to get rid of the use of any syntax commands or computer code. Mplus and CALIS are other available SEM programmes that can be used in numerous situations (Byrne, 2009). As these programmes are becoming more similar as they evolve, the choice of which to use in any research is solely based on researcher preferences and availability (Fabrigar et al., 1999). This research used AMOS to test the theoretical model.

4.8.4.4 Model testing

Once the parameter estimates are obtained for a specified SEM model, the next step is to determine how well the data fit the model. In other words, this step is to determine the extent in which the theoretical model is supported by the data. Model fit can be assessed in two ways: the first is a global-type omnibus test and the second is to examine the fit of individual parameters of the model (Taylor and Todd, 1995a). Evaluation of a model as a whole requires the review of two important aspects of fitting hypothesised model: the model fitting process and goodness-of-fit statistics (Kline, 2005).

i. The model fitting process

The model fitting process is based on the use of a particular fitting function to minimise the difference between Σ and S (Schumacker and Lomax, 2004). S represents the sample covariance matrix (of observed variable scores), Σ (sigma) represents the population covariance matrix (Kaplan, 2000). If Σ and S are similar in some fashion, then it can be said that the data fit the theoretical model. If Σ and S are quite different, then it can be considered that the data do not fit the theoretical model. In contrast to traditional statistical procedures, SEM requires that the null hypothesis (H_0) not be rejected. The null hypothesis (H_0) being tested in this research is that the

hypothesised model holds in the population [i.e., $S = \Sigma$ (Schumacker and Lomax, 2004, Krik, 1996, Cohen, 1994, Thompson, 1996)].

ii. Goodness-of-fit statistics

Goodness-of fit indices (GOF) indicate how well the specified model reproduces the observed covariance matrix among the indicator items. If the researcher's theory is perfect, the observed and estimated covariance matrices will be the same. Otherwise, the closer the values of these two matrices are to each other, the better the model is said to fit. Since the introduction of the first GOF measures, researchers have refined and developed new measures of GOF statistics that reflect various facets of the model's ability to represent the data (Hu and Bentler, 1999). A number of GOF measures are available now, which are classified in three general groups: absolute measures, incremental measures, and parsimony fit measures. A representative list of different goodness-of-fit statistics with its key focus and cut-off values is provided in table 4.2.

Absolute fit indices are a direct measure of how well the model that is specified by the researcher reproduces the observed data (Hayduk et al., 2007). It provides the basic assessment but does not explicitly compare the GOF of a specified model to any other model. The absolute fit indices include chi-square statistics, GFI (Goodness-of-Fit index), RMSEA (Root Mean Square Error of Approximation), RMR (Root Mean Square Residual), SRMR (Standardised Root Mean Residual) and normed Chi-square.

Incremental fit indices assess how well the estimated model fits relative to some alternative baseline model (Hu and Bentler, 1999). It includes NFI (Normed Fit Index), TLI (Tucker Lewis Index), CFI (Comparative Fit Index) and RNI (Relative Noncentrality Index). Among these, CFI and TLI are most widely reported indices.

Parsimony fit indices provide information on which a set of competing models is best. These indices are conceptually similar to the notion of an adjusted R^2 in the sense that they relate model fit to model complexity (Yuan and Zhong, 2013). These indices are not useful in assessing the fit of a single model, but are quite useful in comparing the fit of two models when one is more complex than other (Kline, 2005). This includes AGFI (Adjusted Goodness of Fit Index) and PNFI (Parsimony Normed Fit Index) (Schumacker and Lomax, 2004).

Table 4.2: Classification of goodness-of-fit indices

Type	Definition	GOF indices	Key focus	Cut-off value
Absolute Fit Indices	Direct measures of how well the model that is specified by the researcher reproduces the observed data (Hayduk et al., 2007). It provides the basic assessment but does not explicitly compare the GOF of a specified model to any other model.	Chi-square statistics	The higher the probability associated with chi square, the closer the fit.	$p \geq 0.05$
		GFI (Goodness-of-fit index)	A model is considered suitable if the covariance structure implied by the model is similar to the covariance structure of the sample data.	$GFI > 0.9$
		RMSEA (Root Mean Square Error of Approximation)	This takes into account the error of approximation in the population and indicates how well, in comparison with an unknown but optimally chosen parameter, estimates would fit the population's covariance matrix.	$RMSEA < .05$
		PCLOSE	The closeness of fit (PCLOSE) tests the hypothesis that the RMSEA is 'good' in the population.	$PCLOSE \geq 0.5$
		RMR (Root Mean Square Residual),	The average residual value is derived from the fitting of the variance covariance matrix for the hypothesised model to the variance-covariance matrix of the sample data (Marsh et al., 2004).	$RMR \leq 0.05$
		SRMR (Standardised Root Mean Residual)	This represents the average value across all standardised residuals.	$SRMR \leq 0.05$
Incremental Fit Indices	Assesses how well the estimated model fits, relative to some alternative baseline model (Hu and Bentler, 1999).	NFI (Normed Fit Index)	This statistic assesses the model by comparing the χ^2 value of the model to the χ^2 of the null model.	$NFI \geq 0.95$
		CFI (Comparative Fit Index)	This assumes that all latent variables are uncorrelated (null/independence model) and compares the sample covariance matrix with the null mode.	$CFI \geq 0.95$
Parsimony Fit Indices	Provides information about which model among a set of competing models is best	AGFI (Adjusted goodness-of-fit index)	This adjusts for the number of degrees of freedom in the specified model (Mulaik, 2007).	$(AGFI) > 0.9$

4.8.4.5 Model modification

The final step in structural equation modelling is to consider model modification to achieve a better data-to-model fit. If the hypothesised model has model fit indices that are less than satisfactory, a researcher typically can perform a modification search to find a model that better fits the sample variance-covariance matrix (Hair et al., 2007). More specifically, some areas can be examined to identify problems of inadequate model fit. These include an examination of the modification indices, standardised residuals and specification search.

i. Modification indices

Modification indices are calculated for every possible relationship in a model by SEM. They provide important diagnostic information about potential cross-loading (Yuan and Zhong, 2013), assisting the researcher to assess the extent of model misspecification without estimating a large number of new models. It is calculated not only for estimated parameters but also nonestimated parameters; thus, it provides a diagnosis of error term correlations and correlations between constructs that may not be specified in the hypothesised model (Byrne, 2009).

ii. Standardised residuals

Standardised residuals are individual differences between the observed covariance terms and the estimated covariance terms (Yuan, 2005). The better the fit, the smaller are the residuals. Standardised residuals are simply the raw residuals divided by the standard error of the residual. They can be either positive or negative. Researchers can use these values to identify item pairs for which the specified model does not accurately predict the covariance observed between the items. Typically, values less than 2.5 do not suggest a problem but residuals greater than 4.0 suggest a potentially unacceptable degree of error. The most likely response is dropping one of the items associated with a residual greater than 4.0; however, this guideline need not to be applied to the model if no other issues are associated with the problematic items (Byrne, 2009).

iii. Specification search

A specification search is an empirical trial-and-error approach that uses model diagnostics to suggest changes in the model. The purpose of a specification search is to alter the original model in the search for a model that is better fitting and yields

parameters having practical significance and substantive meaning. This search identifies the set of ‘new’ relationships that best improve the model fit. This process is based on freeing fixed relationships with the largest modification index (Schumacker and Lomax, 2004); however, sole dependence on the large modification indices may introduce inconsistency with the intended purpose of the research in many ways. First, it violates CFA assumptions, which test theories in a confirmatory approach, not as a diagnostic tool. Second, the results of the parameters may be interdependent, so that modifications to one parameter could change the value of others. It is recommended that when conducting CFA the specification search should be limited to major problems (Hair et al., 2007).

4.9 CONSTRUCT VALIDITY

One of the primary objectives of CFA/SEM is to assess the construct validity of a proposed measurement theory. Construct validity is the extent to which a set of measured items actually reflects the theoretical latent construct that they are designed to measure (Thompson and Daniel, 1996). It includes the examination of convergent, discriminant, nomological and face validity.

4.9.1 Convergent validity

Convergent validity refers to a situation where items are indicators of a specific construct and are expected to converge or share a high proportion of variance in common. Factor loadings, average variance extracted and construct reliability are three of the ways to estimate the relative amount of convergent validity among item measures (Schreiber et al., 2006).

4.9.2 Discriminant validity

Discriminant validity is the extent to which a construct is truly distinct from other constructs. High discriminant validity provides evidence that a construct is unique and captures some phenomena that other measures do not. There are two common ways of assessing discriminant validity. First, the factor loadings of any two constructs to be considered as loaded only one construct instead of two. If the model fit of the two-construct model is significantly different from that of the one-construct model, then discriminant validity is supported. Second, a more rigorous test is to compare the average variance extract values for any two constructs with the square of the correlation estimates. The variance extracted

estimates should be greater than the squared correlation estimate (Steinmetz et al., 2009). The logic here is based on the idea that a latent construct should explain more variance in the item measures that it shares with another construct. Passing this test provides good evidence of discriminant validity. In addition, it means that individually measured items should represent only one latent construct (Cudeck and Browne, 1983).

4.9.3 Nomological validity and face validity

Prior to any theoretical testing using CFA, face validity must be established because it is impossible to express and specify correctly a measurement theory without an understanding of every item's content or meaning. Nomological validity is tested by examining whether the correlations among the constructs in a measurement theory make sense or not (Bacon et al., 1995).

4.10 MULTI-GROUP INVARIANCE

The measurement of multi-group models involves more than one sample where the central concern is whether or not components of the measurement model or the structural model are equivalent across particular measurements of interest. Four aspects that need to consider in testing the multi-group invariance are a) establishing the baseline model, b) testing the configural invariance, c) measuring the model invariance and d) estimating the structural model invariance (Bollen, 1989). Jöreskog (1971), recommend that all tests for equivalence begin with a global test of the equality of covariance structures across the groups of interest. Expressed more formally, this initial step tests the null hypothesis as $(H_0), \Sigma_1 = \Sigma_2 = \dots \Sigma_G$, where Σ is the population variance–covariance matrix and G is the number of groups. Rejection of the null hypothesis then argues for the non-equivalence of the groups and, thus, for the subsequent testing of increasingly restrictive hypotheses in order to identify the source of non-equivalence. If H_0 cannot be rejected, the groups are considered to have equivalent covariance structures, and tests for invariance are not needed (Vandenberg and Lance, 2000).

4.10.1 The baseline model

Testing for group equivalence encompasses a series of hierarchical steps that begins with the determination of a baseline model for each group separately. This model represents the one that best fits the data from the perspectives of both parsimony and substantive meaning. Because the estimation of baseline models involves no between-group constraints, the data

can be analysed separately for each group; however, it is important to note that because measuring instruments are often group specific in the way they operate, it is possible that the baseline models may not be completely identical across groups (Bentler, 2006). For example, it may be that the best-fitting model for one group includes an error covariance (Byrne, 2009) or a cross-loading, which may not be specified for the other group. Byrne (1991), shows in a condition of partial measurement invariance, multi-group analyses can still continue.

4.10.2 Configural invariance

Configural invariance tests whether the factor structure represented in the CFA achieves adequate fit when both groups are tested together and freely (i.e., without any cross-group path constraints). The particular importance in testing for configural invariance is that although the factor structure for each group is similar, it is not identical (Byrne, 2009). Although the baseline models test invariance for multiple groups separately, it is necessary to repeat the process for two important reasons. First, it allows for invariance tests to be conducted across the two groups simultaneously: in other words, parameters are estimated for both groups at the same time. Second, in testing for invariance, the fit of this configural model provides the baseline value against which all subsequently specified invariance models are compared (Byrne, 1991).

4.10.3 Measurement and structural invariance

In testing for configural invariance, interest focuses on the extent to which the number of factors and the patterns of their structure are similar across groups. In contrast, when testing for measurement and structural invariance, interest focuses more specifically on the extent to which parameters in the measurement and structural components of the model are equivalent across groups. This testing process is accomplished by assigning equality constraints on particular parameters (i.e., the parameters are constrained equally across groups). In testing for invariance, the classical approach is to run a model by constraining only the factor loadings as equal (i.e., a measurement model). Provided with evidence of group equivalence, these factor-loading parameters remain constrained and equality constraints are then placed on the factor variances and covariances (i.e., structural model) (Byrne, 2009).

Over the past decade or so, researchers have argued that from a practical perspective, the χ^2 difference test represents an excessively stringent test of invariance, particularly in light of the fact that SEM models at best are only approximations of reality (Cudeck and Browne, 1983,

MacCallum et al., 1992). Consistent with this perspective, Cheung and Rensvold (2002) argue that it may be more reasonable to base invariance decisions on a difference in CFI (Δ CFI), rather than on χ^2 values. Based on a rigorous Monte Carlo study of several goodness-of-fit indices, Cheung and Rensvold (2002) propose that evidence of non-invariance should be based on a difference in CFI values exhibiting a probability <0.01 . Although this approach to test invariance has not been received official acceptance to date, its use is increasingly reported in the literature (Steinmetz et al., 2009).

4.11 SUMMARY

This chapter has developed a research methodology that adopts a quantitative approach to analyse the modelling of the intention to use 3PL. It describes the study context and the surveyed area's logistic infrastructures and opportunities. It explains different methodological concerns including sample design, instrument design, data collection procedures, research hypotheses, and instrument validity, and gives an overview of data analysis methods. Efficient logistics are critical for competing in a globalised world, and logistics plays a key role in Bangladesh's efforts to maintain strong growth in exports and move up the value chain of export-based industries. Data are collected from a wide range of industries including both manufacturing and service industries, and key supply chain/logistics/operation professionals are participants of the study. Structural equation modelling is a suitable method to analyse the measurement model, structural model and multi-group models of intention to use 3PL.

The next two chapters will discuss the results relating to data analysis. Chapter 5 will focus on aspects of data preparation and descriptive statistics of 3PL usage in Bangladesh. Chapter 6 will discuss the results relating to modelling the intention to use 3PL services on the basis of the five SEM steps discussed in this chapter.

CHAPTER 5

SURVEY DATA ANALYSIS

5.1 INTRODUCTION

The aim of this chapter is twofold: first to present the results of the descriptive statistics of 3PL usage in Bangladesh, and second to prepare the data for structural equation modelling. This chapter begins by presenting the descriptive results related to the current usage of 3PL services, the organisational factors affecting 3PL usage, the benefits, limitations and impact of 3PL usage, and the intention to use 3PL. Key statistical routines are performed, such as the assessment of data normality, identification of outliers, test of measurement instruments' reliability, and the computation of composite scores using the optimal scaling technique. Finally, the validity of all measurement instruments is checked by conducting the construct validity test.

This chapter specifically answers the following two key questions:

- What key characteristics affect 3PL usage in Bangladesh?
- Do the data meet the assumptions and requirements of structural equation modelling?

5.2 3PL USAGE IN BANGLADESH

Current 3PL usage and practices in Bangladesh, covering four broad aspects: the extent of current 3PL service use, the factors affecting 3PL usage, the impact of the use of 3PL and the intention to use 3PL.

5.2.1 Extent of 3PL usage

About 63 per cent of the 243 respondents indicated that their organisations use 3PL services; 37 per cent indicated that they do not use 3PL services. Among those organisations currently using 3PL services, more than 32 per cent reported that they have used them for more than five years and 31 per cent indicated that they have been using them between one to three years. Of the total respondents 49 per cent said they used 3PL for both domestic and international operations.

Users of 3PL services indicated that their organisations use them for a wide variety of services, typically purchasing multiple services from one provider. The range of those services and the importance placed on those services by the respondent organisations are presented in Figure 5.1. Freight forwarding (over 42 per cent) and order fulfilment (over 41 per cent) were the most important.

Other logistic services outsourced by more than a quarter of the respondent companies include shipment consolidation, logistics information system, warehouse management, product return and packaging. However, services including carrier selection, fleet management and operations, HR recruiting, product assembly and installation are the less preferred services (less than 25 per cent of respondents use these services) for outsourcing to the 3PL providers.

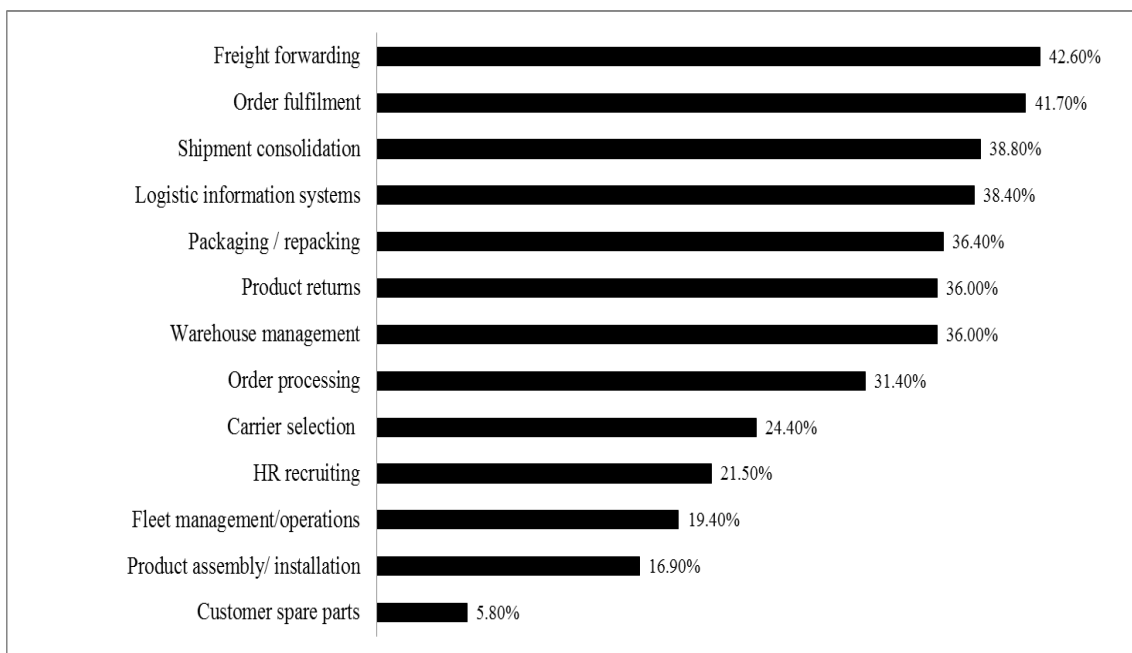


Figure 5.1: Frequently used 3PL functions

Note: Respondents were allowed to respond for more than one option

The use of the various available functions differed between manufacturing and service industries (Figure 5.2):

- In the manufacturing industry, shipment consolidation was cited as the most important 3PL service, followed by freight forwarding, warehouse management and packaging services.
- In the service industry, order fulfilment was the most frequently used service, followed by logistics information system, product returns and HR recruiting.

Although a significant number of organisations use 3PL, the degree of commitment to the services varies considerably. Over 42 per cent indicated that their organisation's commitment to 3PL services was moderate, while 36 per cent and 9 per cent respectively characterised the commitment as limited and very limited. Limited commitment is also reflected in each organisation's budget commitment. Up to 20 per cent of the logistics budget was allocated for

3PL use by 46 per cent of the respondent organisations; only four per cent spent more than 60 per cent. According to Lieb et al. (1993), the length of the relationship between 3PL users and their providers are positively related to the extent of 3PL use: the higher the level of relationship commitment between parties, the higher the willingness to allocate more budget to 3PL services.

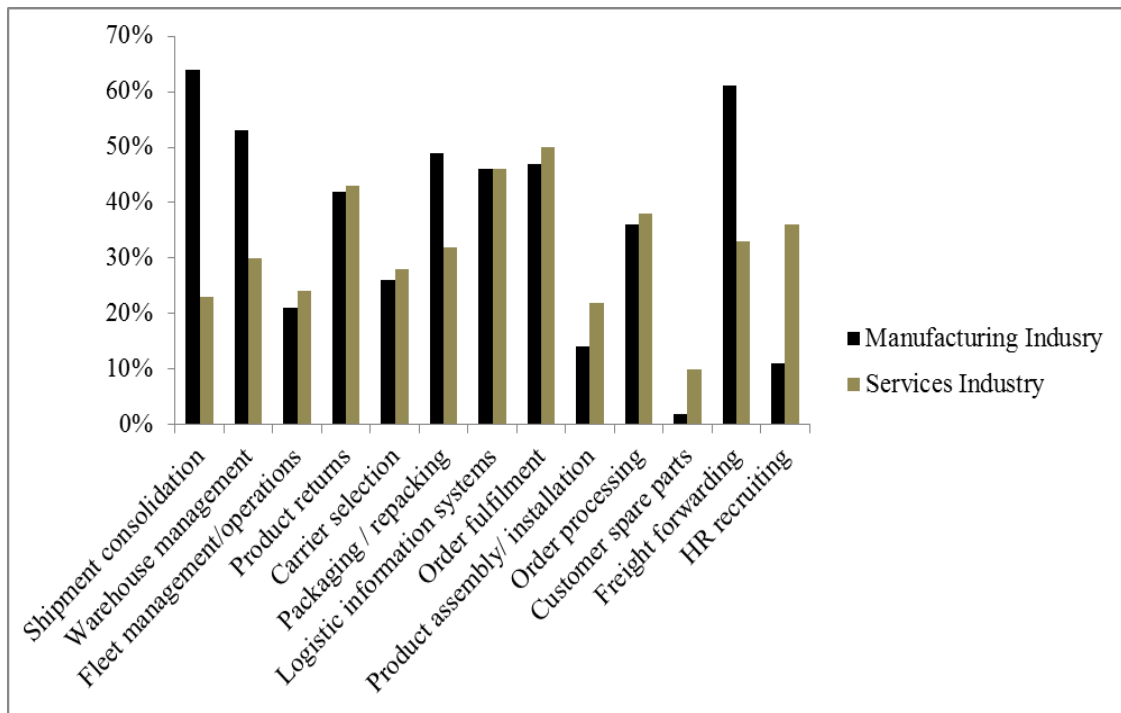


Figure 5.2: Most frequently used 3PL functions, by manufacturing and service industries

Note: Respondents were allowed to respond for more than one option

A chi-square test was conducted to investigate whether the level of commitment is related to the amount of budget devoted to 3PL use or the length of 3PL usage. The results show that both the relationship between the level of commitment and the amount of budget allocated to these services, and between the level of commitment toward the services and the length of 3PL use, are significant at $p < .05$ (Tables 5.1 and 5.2). In other words, organisations that are more committed to using 3PL services are more likely to allocate large proportion of their budget to finance these services. However, the value of Cramer’s V is .174, which indicates a poor strength of association (Table 5.1). Cramer’s V measures the strength of association within a value range of 0–1; a value close to 1 indicates strong association. This means that although level of commitment and budget allocation are associated with each other, the likelihood of increasing commitment with an increase of budget allocation is not very high.

Table 5.1: Cross tabulation of level of commitment and allocated budget to 3PL use

		Budget percentage		
		0–20%	21–40%	41–60%
Level of commitment to 3PL use	<i>Very limited</i>	7.1% (17)	1.3% (3)	.4% (1)
	<i>Limited</i>	19.6% (47)	12.5% (30)	5.6% (11)
	<i>Moderate</i>	17.9% (43)	20.4% (49)	5.6% (11)
	<i>Extensive</i>	1.7% (4)	3.8% (9)	6.2% (15)

Note: Chi-square test revealed an association between length of 3PL use and level of commitment to 3PL use when the categories ‘extensive’ and ‘above 60%’ are collapsed.

Table 5.2: Cross tabulation of length of 3PL use and level of commitment

		Level of commitment toward 3PL use (Percentage of use)			
		<i>Very limited</i>	<i>Limited</i>	<i>Moderate</i>	<i>Extensive</i>
Length of 3PL use	<i>Less than 1 year</i>	1.3% (3)	3.3% (8)	3.3% (8)	.4% (1)
	<i>1 to 3 Years</i>	2.5% (6)	14.6% (35)	13.3% (32)	.4% (1)
	<i>More than 3 Years</i>	2.9% (7)	11.3% (27)	10.8% (26)	3.3% (8)
	<i>More than 5 Years</i>	2.1% (5)	7.5% (18)	15.4% (37)	1.5% (18)

Note: Chi-square test (value: 25.018 and df: 9 p<.05) revealed an association between length of 3PL use and level of commitment toward its use. Cramer’s V= .186.

5.2.2 Organisational factors affecting 3PL usage

Three organisational factors that influence the decision-making process are identified. First is the *organisational level*, where outsourcing decisions are made; second the *sources that made the 3PL user aware* of 3PL services; third the *extent of involvement* of different functional area managers in outsourcing decision making.

Respondents were asked to indicate the organisational level at which the strategic decision to use 3PL services originated or was made. The majority of the respondents, over 63 per cent, indicated that the decision originated at the corporate level; 17 per cent traced it to the divisional level and 4 per cent to the local level. Another 15 per cent of total respondents indicated that their companies use multiple 3PL services and decisions to use them are made at different organisational levels (Table 5.3).

The source that made respondent organisations aware of 3PL services also varied considerably. By far the most frequently cited source was discussion with other logistics professionals (48 per cent), followed by sales contacts (40 per cent); however, it is worth mentioning that respondent organisations often were made aware of 3PL services by more than one source simultaneously.

Table 5.3: Organisational factors affecting 3PL usage

3PL decision taken at		Information source about 3PL services		Other functional managers' involvement	
Corporate level	63.3%	Other logistics professionals	47.9%	Finance	33.5%
Divisional level	16.9%	Sales call by 3PL representative	32.6%	Manufacturing	23.1%
Local level	4.5%	Sales contacts	39.7%	Marketing	52.9%
Multiple levels	14.9%	Ad in professional publication	36.4%	IT	34.7%
		Direct mail advertising	30.6%	HRM	31.4%
		Other	6.6%	Field service	30.2%
				Legal	8.7%
				Purchasing	47.9%

The growing integration and interdependence of logistics and other functional areas of business is clearly exhibited in the responses to a question that sought to determine whether other functional managers are actively involved in the decision to use 3PL. Typically, managers in several functional areas have shown a propensity to become involved in the decision process. More than half of the respondents indicated that managers from the marketing department are primarily involved in the 3PL decision-making process. Few organisations included legal managers in this decision. As evidenced in Table 5.3, marketing (53 per cent), purchasing (48 per cent) and information system (35 per cent) are the departments primarily involved in the selection of 3PL services and providers.

5.2.3 Benefits, limitations and impact of 3PL usage

The organisations using 3PL services typically appreciate multiple benefits (Figure 5.3). According to respondents' rankings, low cost (26 per cent), faster delivery (20 per cent) and accessibility to remote markets (19 per cent) are the greatest benefits. The least cited benefit is using a specialised work force; only 7 per cent of respondents mentioned about this. Other benefits reported by respondents include savings in time, being able to focusing on the core business, and having access to new technology.

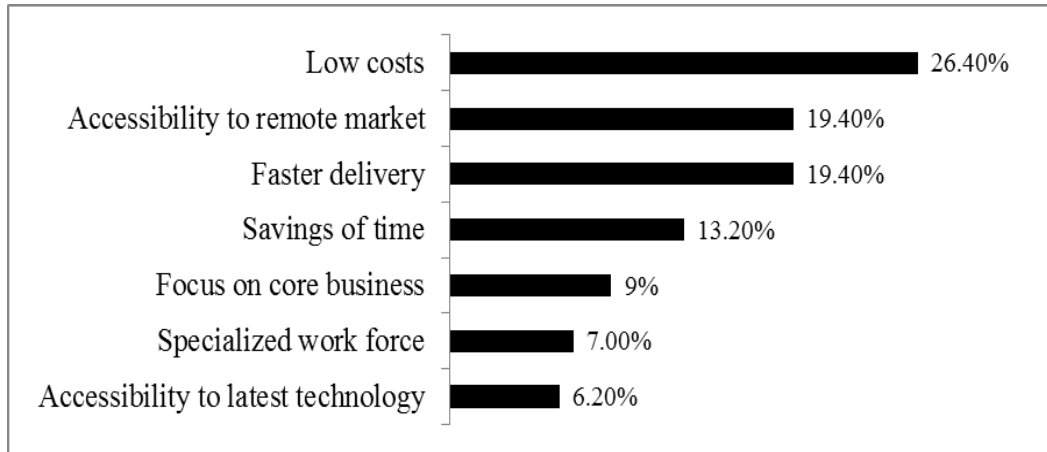


Figure 5.3: Most cited benefits of 3PL usage

Almost one quarter of the respondents faced significant problems caused by 3PL providers' lack of understanding of the organisation's requirements. Leakage of competitive information (over 20 per cent) was given as the second most problematic aspect of 3PL use in Bangladesh. Lack of control over business operations, operational failures, the rise of fraudulent activities involving 3PL usage, improper documentation by 3PL providers and conflict between clients' and 3PL providers' workforces were other impediments to 3PL use mentioned (Figure 5.4).

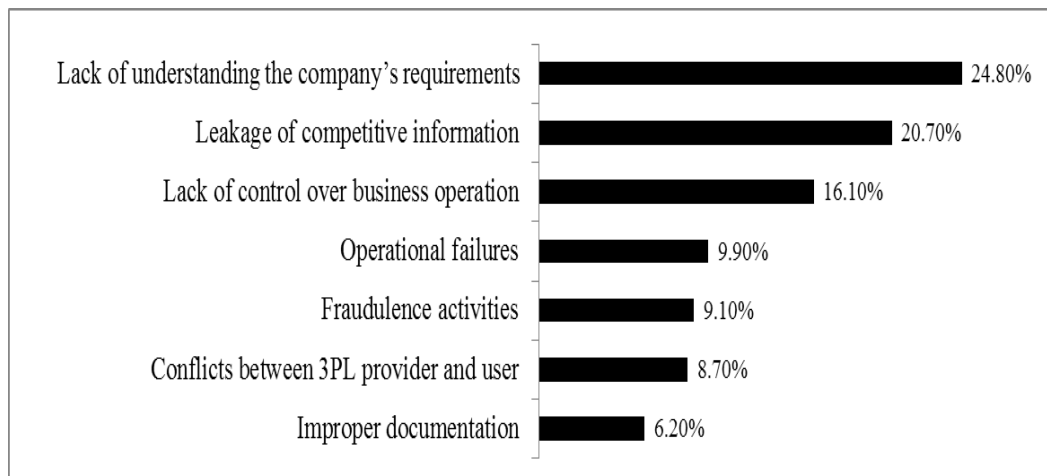


Figure 5.4: Most cited limitations of 3PL usage

The users of 3PL services were asked to categorise the impact of 3PL services on logistics costs, internal logistic system performance, customer satisfaction and employees' morale; the responses are summarised in Figure 5.5. Clearly the use of 3PL services has a positive effect

in all these areas. More than 70 per cent of the respondent organisations indicated that the effect is positive in each area except employee morale.

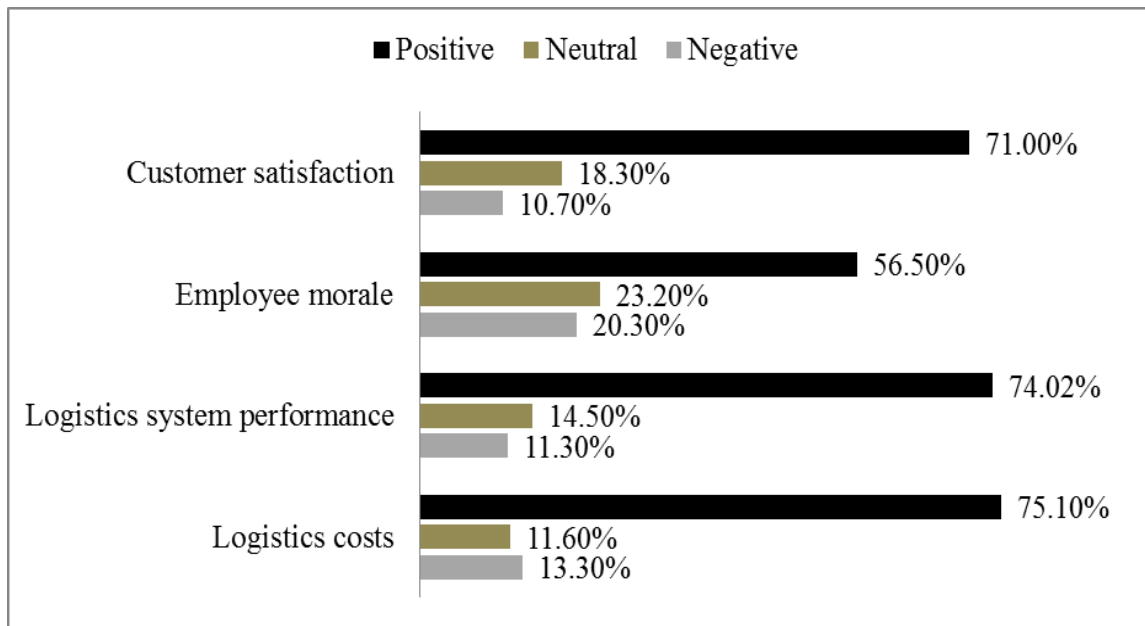


Figure 5.5: The impact of 3PL usage

5.2.5 Inter-industry differences in 3PL usage and intention to use

A cross tabulation was conducted to reveal the inter-industry difference in terms of 3PL usage (Figure 5.4). All 14 industries responded to the survey are divided into two broad categories: manufacturing and service. Results indicate that over 58 per cent of manufacturing organisations use 3PL services, and over 66 per cent of service organisations. However, both categories of industry have a similar percentage of organisations that do not use 3PL. This suggests that current usage of 3PL services in Bangladesh is dominated by the service industry.

Table 5.4: Cross tabulation of 3PL usage and type of industry

		3PL usage	
		Use 3PL	Do not use 3PL
Type of industry	Manufacturing	58.6% (65)	41.4% (46)
	Service	66.7% (88)	33.3% (44)

A t-test of independence was conducted to examine the relationship between all direct constructs of TPB (intention, attitudes, subjective norms and perceived behavioural control) and type of industry. The assumptions of independent observation are met because participants were different in each group and no participant was included in more than one

group. The t- test results illustrated in Table 5.5 show intention statistically significant at $p < 0.5$, meaning that there is a significant difference in the mean values of intention to use 3PL between manufacturing and service industries. Intention to use 3PL is not similar across industries and manufacturing and service industries differ in their intention to use 3PL services. Attitude, subjective norm and perceived behavioural control are not statistically significant; this implies that the mean values for these three constructs are not different across industries. Manufacturing and service industry respondents’ attitudes, subjective norms and perceived behavioural control toward 3PL services are similar.

Table 5.5: Sample t-test (type of industry) ** $p < 0.05$

Constructs	Mean	t-value	p-value	Mean differences	Std. error
Intention	5.66	2.167	.031**	.421	1.525
Attitude	5.60	1.185	.237	.248	1.629
Subjective norm	4.96	1.161	.247	.207	1.396
Perceived behavioural control	4.88	.393	.695	.074	1.468

5.2.6 3PL usage and intention to use across different sizes of organisation

Organisations’ sizes are collapsed into two major categories: large and small to medium-sized, to understand the interrelationships between current 3PL usage and size of organisation. Results of the cross tabulation indicates that the small and medium-sized organisations that use 3PL services made up 75 per cent of total respondents. Almost 50 per cent of large organisations use 3PL (Table 5.6), but reported more as non-users of 3PL at above 50 per cent. This implies that in this research, the current usage of 3PL services in Bangladesh is prevalent among small and medium-sized organisations.

Table 5.6: Cross tabulation of 3PL usage and size of organisations

		3PL Usage	
		<i>Use 3PL</i>	<i>Do not Use 3PL</i>
Size of Organisation	<i>Small and medium</i>	75% (96)	25% (32)
	<i>Large</i>	49.6% (57)	50.4% (58)

The independent sample t-test illustrated in Table 5.7 examines the relationship between all direct constructs of TPB and the size of organisations. Results related to the t-test indicate that

none of the direct constructs of TPB are statistically significant across different sizes of organisation except attitude, which is statistically significant at $p < 0.05$. This means that attitude toward 3PL services differ between small and medium, and large organisations. However, different organisational sizes make no difference in terms of forming the intention to use 3PL, peer pressure to use it, or perceived behavioural control in making such a decision.

Table 5.7: Sample t-test (size of organisations) ** $p < 0.05$

Constructs	Mean	t-value	p-value	Mean differences	Std. error
Intention	5.66	.752	.453	.148	1.525
Attitude	5.60	2.301	.022**	.479	1.629
Subjective norm	4.96	.329	.743	.059	1.396
Perceived behavioural control	4.88	.680	.983	.004	1.468

5.3 DATA PREPARATION

Data preparation is the process of reducing measurement errors, and tests the reliability of data so that the data set is suitable for structural equation modelling. This section discusses the data screening procedures and assumptions that are considered prerequisites to using a multivariate technique such as SEM.

5.3.1 Missing data

During the survey, the online data collection tool did not consider the respondents who attempted to respond but didn't complete the questions. The data missing because of the data collection design are considered ignorable missing data. A total of 251 responses were received, of which eight were incomplete and discarded from further analysis. It is worth mention that among those eight responses, the missing data has no specific pattern but seems to be random (Hair et al., 2007).

5.3.2 Coefficient alpha and reliability

Cronbach's alpha is generally used as a measure of the internal consistency or reliability of a measurement instrument (Steinmetz et al., 2009). It measures how well a set of variables or items measures a single latent construct. The alpha coefficient ranges in value from 0 to 1, a value between $0.7 \leq \alpha < 0.9$ is considered acceptable. The reliability value for each construct

is well above the value of 0.75, which is considered satisfactory (Vandenberg and Lance, 2000, Fink and Litwin, 1995).

5.3.3 Assessment of multivariate normality, outlier and multicollinearity

Assessment of multivariate normality and outliers are two important pre-requisites for applying an estimation technique like maximum likelihood (ML). The general guideline is, if the value of the standardised univariate kurtosis index (β_2) is equal to or greater than 7, it is an indication of departure from normality (Marsh et al., 2004). The standardised kurtosis index (β_2) reveals that the positive values of univariate kurtosis range from .023 to 1.996, and negative values from $-.016$ to -1.142 (Appendix 3). Using this value of 7 as a guide, a review of the kurtosis values reported in Appendix 3 reveals no item to be substantially kurtotic. Although distribution of observed variables is univariate normal, the multivariate distribution can still be multivariate non-normal (Hu and Bentler, 1999). Thus, turning to the index of multivariate kurtosis and its critical ratio (which appear at the bottom of the kurtosis and critical ratio columns) reveals the values of 224.100 and 58.881 respectively (Appendix 3). Bentler (2005), has suggested that, in practice, values greater than 5.0 are indicative of data that are non-normally distributed. In this application the z-statistic of 224.100 is highly suggestive of non-normality in the sample. It should be noted that the Mahalanobis distance (D^2) test reveals minimal evidence of serious multivariate outliers.

When data reveal evidence of multivariate kurtosis, interpretations based on the usual ML (maximum likelihood) estimation may be problematic, and an alternative method of estimation is likely to be more appropriate. One approach to the analysis of non-normal data is to base analyses on an asymptotic distribution free (ADF) estimation (Mulaik, 2007). However, it is now well known that unless sample sizes of between 1,000 and 5,000 are used, according to Hu and Bentler (1999), the ADF ‘estimator performs very poorly and can yield severely distorted estimated values and standard errors’ (Mulaik, 2007, p. 47). More recent statistical research has suggested that, at the very least, sample sizes should be greater than 10 times the number of estimated parameters, or the results from the ADF method generally cannot be trusted (Yuan and Zhong, 2013). The model under this study has 46 freely estimated parameters, requiring a minimal sample size of 460. Given that the current sample size is 243, the use the ADF method of estimation is unrealistic. One approach to handling the presence of multivariate non-normal data is to use a procedure known as bootstrapping (Hu and Bentler, 1999). Bootstrapping serves as a resampling procedure by which the original

sample is considered to represent the population. Its primary advantage is that it allows the researcher to assess the stability of parameter estimates and thereby report their values with a greater degree of accuracy. The procedure also provides a mechanism for addressing situations where ‘the ponderous statistical assumptions of large sample size and multivariate normality may not hold’ (Yuan, 2005, p. 135). Accordingly, this research is based on the analyses from the ML estimation technique using bootstrapping.

Multicollinearity refers to the degree to which explanatory variables are correlated with other variables. Although there is no irrefutable test to determine the exact nature of multicollinearity, a common rule of thumb is that VIFs of 10 or higher (or equivalently, tolerances of .10 or less) may be reasons for concern (Hair et al., 2007). Results of this test indicate that this assumption is not violated (Appendix 4).

5.3.4 Optimal scaling

Theoretically, in TPB both measures (direct and indirect) of the same construct must be closely correlated. The rationale for maximising associations in TPB, using attitude as an example, is that behavioural beliefs (an integration of behavioural belief strength; BBS and outcome of evaluations; OE) are supposed to determine attitude completely. Indirect constructs are multiplicative when combined (i.e., behavioural beliefs are the product of behavioural belief strength and the outcome of evaluations), whereas direct constructs are measured by different items using a Likert scale. There is a need to rescale indirect constructs by using an optimal scaling method so that correlation can be measured between direct and indirect measures (Ajzen and Driver, 1991). Optimal scaling is based on the estimates obtained in the multiplicative regression model. A multiplicative model is supported if it explains significantly more variance in the direct measure than the additive model (Hardeman et al., 2013). This involved testing the multiplicative model against the additive model using hierarchical linear regression, as recommended by Michel et al. (2001) and Thompson and Daniel (1996). The results related to both the additive and multiplicative regression models are represents in Table 5.8 (a, b and c).

Table 5.8: Hierarchical linear regression (comparisons of additive and multiplicative models)

Table 5.8a: Attitude and behavioural belief [$R^2 = .058$ (Model 1); .363 (Model 2)]				
Attitude	B	SE	β	ρ
Model 1 (Additive)				
Sum of BBS	.208	.072	.189	.004
Sum of OE	.133	.084	.103	.116
Model 2 (Multiplicative)				
Sum of BBS	-.532	.091	-.484	.000
Sum of OE	-1.097	.134	-.850	.000
Multiplicative Composite	.236	.022	1.425	.000

Table 5.8b: Subjective norm and normative belief [$R^2 = .544$ (Model 1); .555 (Model 2)]				
Subjective Norm	B	SE	β	ρ
Model 1 (Additive)				
Sum of NBS	.779	.054	.717	.000
Sum of MC	.059	.071	.042	.404
Model 2 (Multiplicative)				
Sum of NBS	.228	.230	.210	.321
Sum of MC	-.332	.173	-.234	.056
Multiplicative Composite	.091	.037	.692	.014

Table 5.8c: Perceived behavioural control and control belief [$R^2 =$.008 (Model 1); .009 (Model 2)]				
Perceived Behavioural Control	B	SE	β	ρ
Model 1 (Additive)				
Sum of CBS	.126	.094	.087	.179
Sum of CBP	.019	.072	.017	.789
Model 2 (Multiplicative)				
Sum of CBS	.230	.200	.158	.251
Sum of CBP	.185	.291	.166	.525
Multiplicative Composite	-.034	.057	-.171	.557

Note: Method=ENTER. B=unstandardised coefficient, SE=standard error, β =standardised coefficient, ρ =significance level; R^2 =explained variance in the dependent variable; BBS, behavioural belief strength; OE, outcome evaluation; NBS, normative belief strength; MC, motivation to comply; CBS, control belief strength; CBP, control belief power.

The multiplicative model explains significantly more variance in the direct measure of attitude than the additive model (36 per cent vs. 6 per cent; $F(1,552) = 45.432$; $p < .000$; Table 5.8a), with the multiplicative composite as a significant positive predictor ($b = 1.425$; $p < .000$). For subjective norm, the explanation of variance in the direct measure is also significantly greater (56 per cent vs. 55 per cent; $F(1,058) = 99.496$; $p < .000$), with the composite as a significant predictor ($b = .692$; $p = .014$). However, although the multiplicative model did not fail to explain significantly more variance in the direct measure of perceived behavioural

control than the additive model (.9 per cent vs. .8 per cent); $F(34) = .748$; the significance level is greater than .05 in both models ($p=.525$).

As all three predictors of the intention to use 3PL explain more variance in the multiplicative regression model, optimal scaling is based on the multiplicative composites. Figure 5.6 represents the procedure of constructing optimal scaling (Hardeman et al., 2013) for indirect measures, using the example of behavioural beliefs.

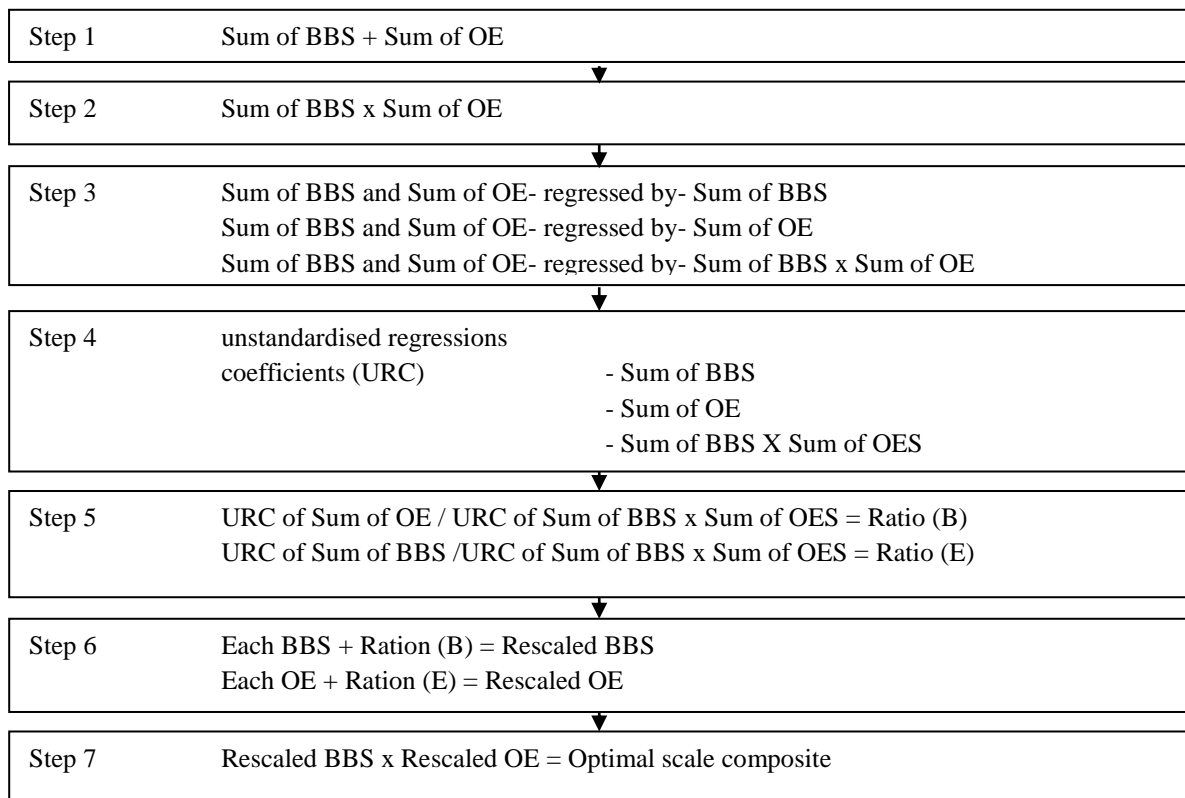


Figure 5.6: Steps in constructing optimal scaling for indirect measures (*using the example of behavioural beliefs*)

Note: BBS=behavioural belief strength; OE=outcome evaluation, URC=unstandardised regressions Coefficients, Sum=Summation.

5.4 CONSTRUCT VALIDITY

Validity is defined as the extent to which research is accurate. Evidence of construct validity provides confidence that the item measures are taken from a sample that represents the population (Hair et al., 2007).

5.4.1 Convergent validity

This depends on three aspects: factor loadings and their significance, average variance extracted value, and the constructs' reliability value.

Factor loadings: Generally, standardised loading estimates are .5 higher (ideally .7 or higher) and are considered as signs of convergent validity (Einax et al., 2004). If loadings are significant and are high on their corresponding construct, it indicates that the items are converging on a common point/latent construct. All the constructs except perceived behavioural control support the adequacy of factor loadings for the measurement model.

Average variance extracted (AVE): Average Variance Extracted (AVE) is the sum of squared multiple correlations divided by the number of items. As a rule of thumb, a value of AVE higher than .5 suggests adequate convergence (Hair et al., 2007). All constructs have AVE values higher than 0.5 except behavioural beliefs, control beliefs and perceived behavioural control (PBC) (Table 5.9); however, the AVE values for three constructs (behavioural beliefs, control beliefs and PBC) are fall short only by .028 from the recommended value of 0.5, meaning that the research constructs have adequate convergence validity.

Construct reliability: Generally, construct reliability of .7 or higher (.6 to .7 is in the acceptable range) is considered a sign of convergent validity (Ho, 2014). The construct reliability of intentions, subjective norms and normative beliefs are 0.794, 0.70 and 0.704 respectively. This indicates good construct reliability; the construct reliability of attitudes, perceived behavioural control, behavioural beliefs and control beliefs are in the acceptable range of 0.60 (Table 5.9). High construct reliability indicates that internal consistency exists, meaning that all measures consistently represent their respective latent construct.

5.4.2 Discriminant validity

A discriminant validity check compares the AVE values with the square of the correlation estimates for every possible pair of constructs. The AVE should be greater than the squared correlation estimate. This analysis reveals that the AVE values for each construct are greater than the squared correlation between constructs, indicating that discriminant validity is achieved (Table 5.9); from this it can be argued that all latent constructs in the measurement model explain more variance in their own item measures than they share with another construct.

5.4.3 Nomological validity

Nomological validity is tested by examining whether the correlations among the constructs in a measurement theory make sense (Hair et al., 2007). Correlation supports the prediction that all these constructs are positively related to one another except control beliefs. With this exception, all constructs have significant positive correlations with intention (Table 5.9).

Table 5. 9: Measures’ correlations (square), Cronbach’s alpha, AVE and construct reliability

Measure	Behavioural belief	Normative belief	Control belief	Attitude	Subjective norm	PBC	Intention
Behavioural beliefs	1						
Normative beliefs	.388** (.150)	1					
Control beliefs	.363** (.132)	.065 (.004)	1				
Attitudes	.237** (.056)	.607** (.368)	.057 (.003)	1			
Subjective norms	.359** (.129)	.678** (.459)	.123 (.015)	.627** (.393)	1		
PBC	.197** (.039)	.478** (.228)	.067 (.004)	.548** (.300)	.614** (.377)	1	
Intention	.291** (.084)	.638** (.407)	.075 (.005)	.650** (.422)	.665** (.442)	.524** (.274)	1
<i>Cronbach’s Alpha</i>	<i>0.824</i>	<i>0.856</i>	<i>0.662</i>	<i>0.886</i>	<i>0.833</i>	<i>0.815</i>	<i>0.902</i>
<i>AVE</i>	<i>0.473</i>	<i>0.512</i>	<i>0.484</i>	<i>0.522</i>	<i>0.591</i>	<i>0.472</i>	<i>0.815</i>
<i>Construct Reliability</i>	<i>0.646</i>	<i>0.704</i>	<i>0.64</i>	<i>0.681</i>	<i>0.7</i>	<i>0.651</i>	<i>0.794</i>

Note: **P<0.05

5.5 SUMMARY

This chapter presents the descriptive results in relation to current 3PL usage, factors influencing 3PL usage, and the impact of 3PL usage on business performance. It also considers the effects of missing data, multivariate outliers, multivariate normality and multicollinearity. The research instruments are validated on the basis of construct validity criteria and that data can be used for further application of SEM.

This chapter concludes with the following key results of descriptive statistics and data preparation:

- 63 per cent of the respondents reported using 3PL services in Bangladesh; 37 per cent did not.
- Freight forwarding and order fulfilment are the services most often outsourced to 3PL providers. Reductions in costs, access to remote markets, and faster delivery were cited as major benefits of outsourcing. Leakage of competitive information is identified as a major concern for 3PL service users.

- The intention to use 3PL varies across industries, and attitudes toward 3PL differ between small to medium-sized organisations and large organisations.
- There is no serious multivariate outlier and the test of multicollinearity indicates that the assumptions for performing structural equation modelling are not violated. However, as the data are non-normally distributed, bootstrapping is used to enable use of the maximum likelihood estimation method.
- Optimal scaling is used to rescale the indirect constructs of TPB (which are multiplicative when combined) so that correlations can be measured between direct and indirect measures of TPB.
- The examination of convergent validity supports the adequacy of factor loadings. All constructs have AVE values higher than 0.5, and the composite reliabilities of the constructs all fall within an acceptable range. All possible pairs of constructs have positive correlation, thus supporting nomological validity; therefore, these research constructs have adequate construct validity.

The next chapter discusses the step-by-step data analysis of SEM including the EFA and CFA analysis.

CHAPTER 6

MODELLING THE INTENTION TO USE 3PL

6.1 INTRODUCTION

This chapter develops a model to identify the factors that predict business customers' intention to use 3PL. Analyses are conducted to test the model's fit with the data and to establish the structural relationships hypothesised in the theoretical framework. Figure 4.2 (in Chapter 4) is used as the basis for analysis and testing the hypothesised structural relationships.

Specifically, this chapter seeks to address the following questions:

- How well the model fit to data?
- Are the hypothesised relationships of the modelling framework significant?
- Does group difference influence the hypothesised relationships between predictor constructs and the intention to use 3PL?

6.2 DATA ANALYSIS

To analyse the data, structural equation modeling (SEM) is used by applying SPSS and AMOS 21 software programs. The six steps of data analysis process are outlined in Figure 6.1. At first, exploratory factor analysis (EFA) is used to verify that each set of measurement items is loaded only on the corresponding factors specified in the theoretical framework. Then the correlation between direct and indirect constructs of the intention to use 3PL is measured. A confirmatory factor analysis (CFA) is conducted to estimate both the measurement model and the structural model. Since the indirect constructs of TPB are multiplicative in nature, measurement of the indirect constructs through CFA is not logical; therefore, a path analysis test is used to predict the intention to use 3PL along with the salient beliefs that contribute to attitudes, subjective norms and perceived behavioural control. A common method bias test is applied to determine if any bias exists in the dataset, caused by something external to the measures. Finally, a multi-group invariance test is conducted to know whether the components of the measurement or structural model are equivalent across the groups of 3PL users and non-users.

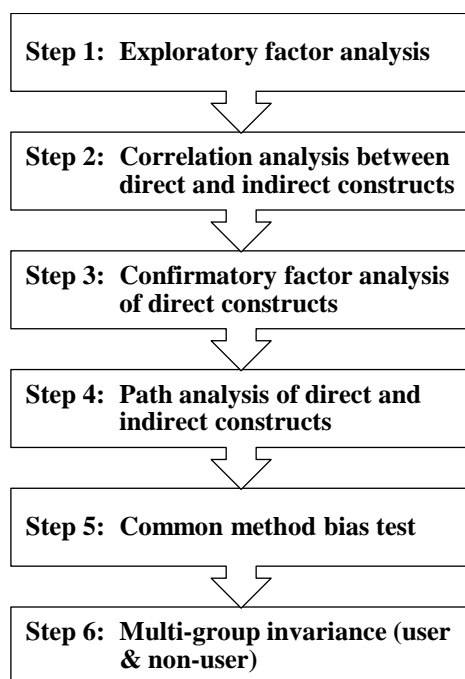


Figure 6.1: Data analysis process

6.2.1 Step 1: exploratory factor analysis

Exploratory factor analysis (EFA) is used to determine whether the four latent variables (attitude, subjective norms, perceived behavioural control and intention) underlie the complete set of items in the context of Bangladesh. Since the questionnaire items are contextualised through an elicitation study and subsequent test-retest reliability, EFA helps to detect the meaningful patterns among the variables that used as measures for extracting the main behavioural factors of modeling intention to use 3PL. There are two common methods of factor extraction: principal component analysis (PCA) and principal axis factoring (PAF). This research conducted PAF for two reasons: first, if the a priori assignment of items to latent variable is driven and determined by theory, PAF is the suggested method for conducting exploratory factor analysis (Fabrigar et al., 1999, Anderson and Gerbing, 1988, Chen et al., 2008),; and second, it is preferred for the purposes of structural equation modeling (Rencher and Christensen, 2012).

Factor loadings for each item on its corresponding factors align to the objective of having a high loading on only a single variable (Table 6.1). Given the sample size of 243, factor loadings of .35 and higher are considered significant for interpretive purposes (Hair et al., 2007). Most of the items loaded strongly on their intended factors: the lowest is 0.421, which is above the threshold level of .35. Item rPBC4 is not loaded on the factor PBC which is

below .35. However, for the purposes of subsequent confirmatory factor analysis rPBC4 will be retained. Cronbach’s alpha is one of the most widely used measures for evaluating reliability (Koufteros, 1999). The Cronbach’s alpha value for each measure is shown in table 6.1. The reliability value for each construct was well above the value of 0.75, which is considered satisfactory for research ((Nunnally, 1978, Fink and Litwin, 1995).

Table 6.1: Rotated factor loadings

Item	Factor				Cronbach’s alpha
	Intention	Subjective norm	Attitude	Perceived behavioural control	
IU1	.781				.902
IU2	.710				
rIU3	.771				
SN1		.451			.833
SN2		.454			
SN3		.421			
SN4		.580			
rAT1			.527		.866
AT2			.554		
rAT3			.805		
rAT4			.783		
rAT5			.772		
rAT6			.735		
AT7			.579		
PBC1				.506	.815
PBC2				.716	
PBC3				.727	
PBC5				.640	
PBC6				.696	

Note: IU=items measuring intention, SN=items measuring subjective norms, AT=items measuring attitude, PBC= items measuring perceived behavioural control, r associated with items= recoded items

6.2.2 Step 2: correlations between direct and indirect measures

Pearson product–moment correlation coefficients are computed to assess the relationship between the direct (attitudes, subjective norms and perceived behavioural control) and indirect (behavioural, normative and control beliefs) constructs of the theoretical model. The results related to correlation analysis are presented in Table 6.2. They reveal two pairs of correlation significant at $p < 0.01$ level. The relationship between attitudes and behavioural beliefs ($r = .237$) and between subjective norms and normative beliefs ($r = .678$) are statistically significant. The relationship between perceived behavioural control and control beliefs is not statistically significant ($r = .067$); the correlation between this pair is also poor. This implies that attitudes and subjective norms are related to the sets of salient behavioural

and normative beliefs respectively, although the exact nature of these relationships is not revealed with certainty (Ajzen, 1991).

Table 6.2: Correlation between direct and indirect measures (**p < 0.01)

Direct measures	Indirect measures		
	Behavioral beliefs	Normative beliefs	Control beliefs
Attitudes	.237**	-	-
Subjective norms	-	.678**	-
Perceived behavioural control	-	-	.067

6.2.3 Step 3: Confirmatory factor analysis

Confirmatory factor analysis (CFA) ‘estimates the parameters of the model once the model has been specified a priori on the basis of theoretical knowledge’ (Bentler and Chou, 1987,p. 98). The theory of planned behaviour (TPB) is the base from which to specify the confirmatory model, including the estimation of the measurement model the structural model.

6.2.3.1 Measurement model

The results related to the measurement model are articulated through the five-step process of SEM (specification, identification, estimation, testing and modification).

i. Model specification

Two types of measurement models are examined: one factor congeneric measurement model and multi-factor measurement model.

One-factor congeneric measurement models: Four one-factor congeneric models are conducted independently to assess item reliability, scale reliability and dimensionality (Anderson and Gerbing, 1988). They are analysed by examining the relationships between a single latent variable and a number of observed variables with regard to overall model fit. It is hypothesised that three observed variables (IU1, rIU2 and IU3) measure intention, four (SN1, SN2, SN3 and SN4) measure subjective norms, six (PBC1, PBC2, PBC3, rPBC4, PBC5 and PBC6) measure perceived behavioural control, and seven (rAT1, AT2, rAT3, rAT4, rAT5, rAT6 and AT7) measure attitudes. For example, Figure 6.2 shows a one-factor congeneric measurement model for attitude and the rest of the one-factor congeneric models are presented in Appendix 5.

Multi-factor measurement model: The model for the multi-factor analysis is diagrammed in Figure 6.3. There are twenty observed variables with four different latent variables (factors). As Figure 6.3 indicates, each observed variable is hypothesised to measure only a single factor; thus, twenty observed variables for four factors with twenty factor loadings are hypothesised. The factors are hypothesised to be correlated and the measurement error variances are not related (zero correlated measurement errors).

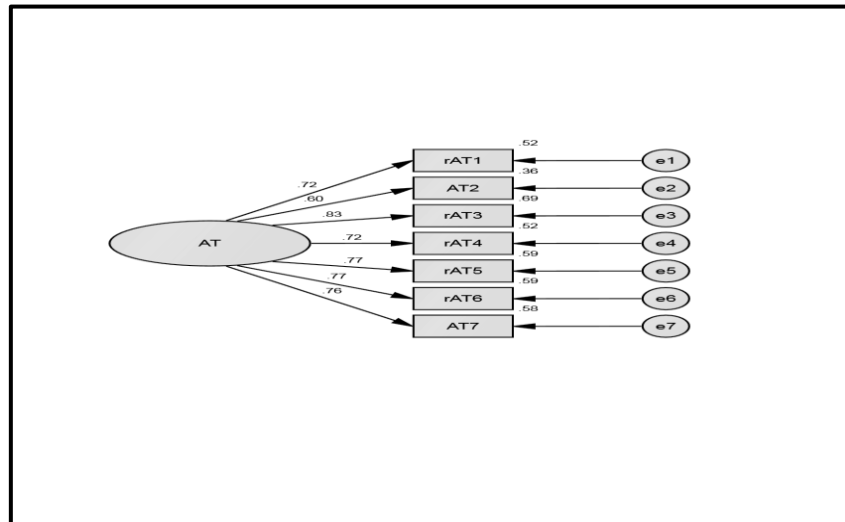


Figure 6.2: One-factor congeneric measurement model (attitude)

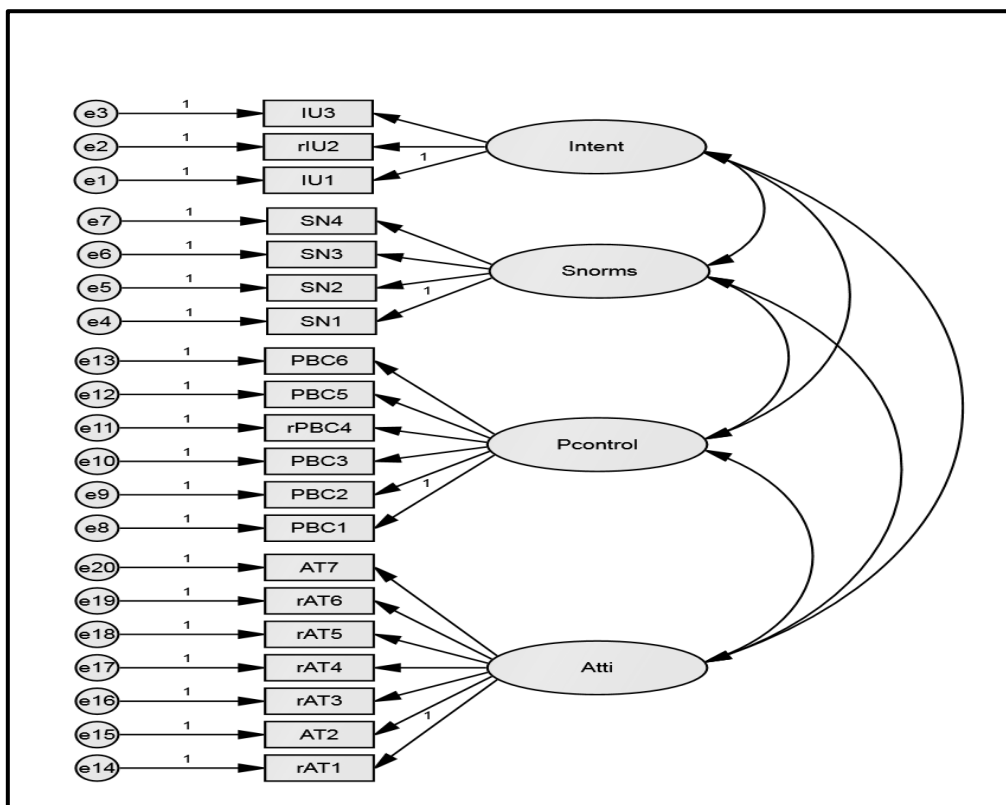


Figure 6.3: Multi-factor measurement model

Table 6.3 lists all the variables in the multi-factor measurement model, accompanied by their categorisation as either observed or unobserved, and endogenous or exogenous. Consistent with Figure 6.3, all the observed variables operate as dependent (i.e., endogenous) variables in the model; all factors and error terms are unobserved, and operate as independent (i.e., exogenous) variables. This information is followed by a summary of the total number of variables, and the number of items in each of the four factors. In the confirmatory factor model, some parameters are fixed and others are free: for example, IU1 is not allowed to load on ‘subjective norms’, which is considered a fixed parameter, but is allowed to load on ‘intention’, which is considered a free parameter. In this analysis there are 40 regression weights, 24 of which are fixed and 16 estimated. The 24 fixed regression weights include the first of each set of four factor loadings (fixed at 1) and the 20 error terms (also fixed at 1). There are 6 covariances and 24 variances, all of which are estimated. In total there are 70 parameters, 46 of which are to be freely estimated (Appendix 6).

Table 6.3: Summary of model variables

Intention	Attitudes	Subjective norms	Perceived behavioural control
Observed endogenous variables			
IU1	rAT1, AT2	SN1	PBC1, PBC2
rIU2	rAT3 ,	SN2	PBC3, rPBC4
IU3	rAT4, rAT5, rAT6, AT7	SN3, SN4	PBC5, PBC6
Unobserved exogenous variables (measurement residuals)			
e1	e14, e15	e4	e8, e9
e2	e16, e17	e5	e10, e11
e3	e18, e19, e20	e6, e7	e12, e13
Variable Counts			
Number of variables in the model:		44	
Number of observed variables:		20	
Number of unobserved variables:		24	
Number of exogenous variables:		24	
Number of endogenous variables:		20	

Note: IU=items measuring intention, SN=items measuring subjective norms, AT=items measuring attitude, PBC= items measuring perceived behavioural control, r associated with items= recoded items, e= measurement residuals.

ii. Model identification

The identification of the model is based on two considerations: order condition and the three indicator rule

- *Order condition:* Order condition refers to the degrees of freedom for a model that need to be greater than zero. It is expected that the number of unique covariance and variance terms, less the number of free parameter estimates, will be positive (Hair et al., 2007). A total of 46 parameters are freely estimated and the number of fixed parameters is 24 (4 factor loadings and 20 measurement error variances). The number of distinct values in the matrix S (sample covariance matrix) is equal to

$$p(p+1)/2 = 20(20+1)/2 = 210$$

Where, p is the number of observed variables in the sample variance–covariance matrix. The number of values in S is 210, which is greater than the number of free parameters ($df = 210 - 46 = 164$). According to the order condition, this model is overidentified because there are more values in S than parameters to be estimated: that is, the degree of freedom is positive rather than zero (just-identified) or negative (under identified). However, this is only a necessary condition and does not guarantee that the model is identified (Kaplan, 2000).

- *Three-indicator rule:* The three-indicator rule is satisfied when all factors in a measurement model have at least three significant indicators (Hair et al., 2007). In this case, all four constructs have more than three significant items except intention, which has three items.

iii. Model estimation

To estimate model parameters, three criteria are of interest: their feasibility, their statistical significance, and the appropriateness of the standard errors.

- *Feasibility of parameter estimates:* all standardised path coefficients and standardised correlation estimates between constructs are less than the value 1.0 (Figure 6.4), which represents a set of feasible parameter estimates.
- *Statistical significance of parameter estimates:* based on a probability level of .05 and test statistic of $> \pm 1.96$, the unstandardised solution reveals that all estimates are statistically significant (Appendix 7).
- *Appropriateness of standard errors:* in this measurement model, no negative standard error is observed and the correlation matrix is positive definite, which reflects the precision with which a parameter has been estimated (Appendix 7).

iv. Model testing

In the one-factor congeneric model analysis all four models are evaluated and modified until an acceptable fit is obtained. Results related to one-factor congeneric models are reported in Table 6.4. Of these models, only one (intention) is just identified, and the other measurement models fit the data reasonably well. The *p*-value associated with the chi-square result is .000 for all those one-factor congeneric models. This implies that the *p*-value is significant using the probability value of .05. Thus, the chi-square goodness of fit statistics does not indicate that the observed covariance matrix matches the estimated covariance matrix within sample variance. However, given the debates associated with using the chi-square test alone for model fit, there is a need to examine other fit statistics. One rule of thumb suggests that research should rely on at least one absolute fit index and one incremental fit index, in addition to the chi-square results (Steinmetz et al., 2009). Accordingly, the values associated with CFI, GFI and NFI are checked, and indicate reasonably good model fit. RMSEA values are relatively high, but still within the cut-off value of .08 to .10 (except subjective norms).

Table 6.4: Goodness-of-fit statistics for four one-factor congeneric models

Construct	χ^2	df	χ^2/df	GFI	CFI	NFI	RMSEA
Intention	.000	0	0	1.00	1.00	1.00	.805
Attitude	28.092	9	3.121	.963	.972	.063	.094
Subjective norms	9.373	2	4.687	.982	.983	.979	.123
Perceived behavioural control	6.223	8	.778	.991	1.00	.989	.000

Results from the multi-factor confirmatory analysis are presented in Figure 6.4. All item loadings are statistically significant at probability level .01 but rPBC4 has factor loadings slightly below the threshold level .35, which is also considered problematic during EFA analysis. For the sake of better model fit it was retained in the model for subsequent CFA. The constructs are found to be interrelated, with the highest correlation between intention and subjective norms ($r = .80, p < .01$) and the weakest between perceived behavioural control and intention ($r = .63, p < .01$).

In this multi-factor measurement model, the chi-square value is 404.918 with a probability level equal to .000. The value of RMSEA, an absolute fit index, is .078. This is within the cut-off range of .08 to .10. Using the 90% confidence interval for this RMSEA value, it can be

concluded that the true value of RMSEA is between .068 and .088 and therefore the RMSEA provides support for reasonable model fit. The normed chi-square is 2.469. A number smaller than 2.0 is considered very good and between 2.0 and 5.0 is acceptable. Moving to the incremental fit indices, the CFI, which is the most widely used index, has a value of .920. Unlike the value of RMSEA, this CFI value exceeds the guidelines of greater than .90. The other incremental fit index (NFI and RFI) also exceeds suggested cut-off values.

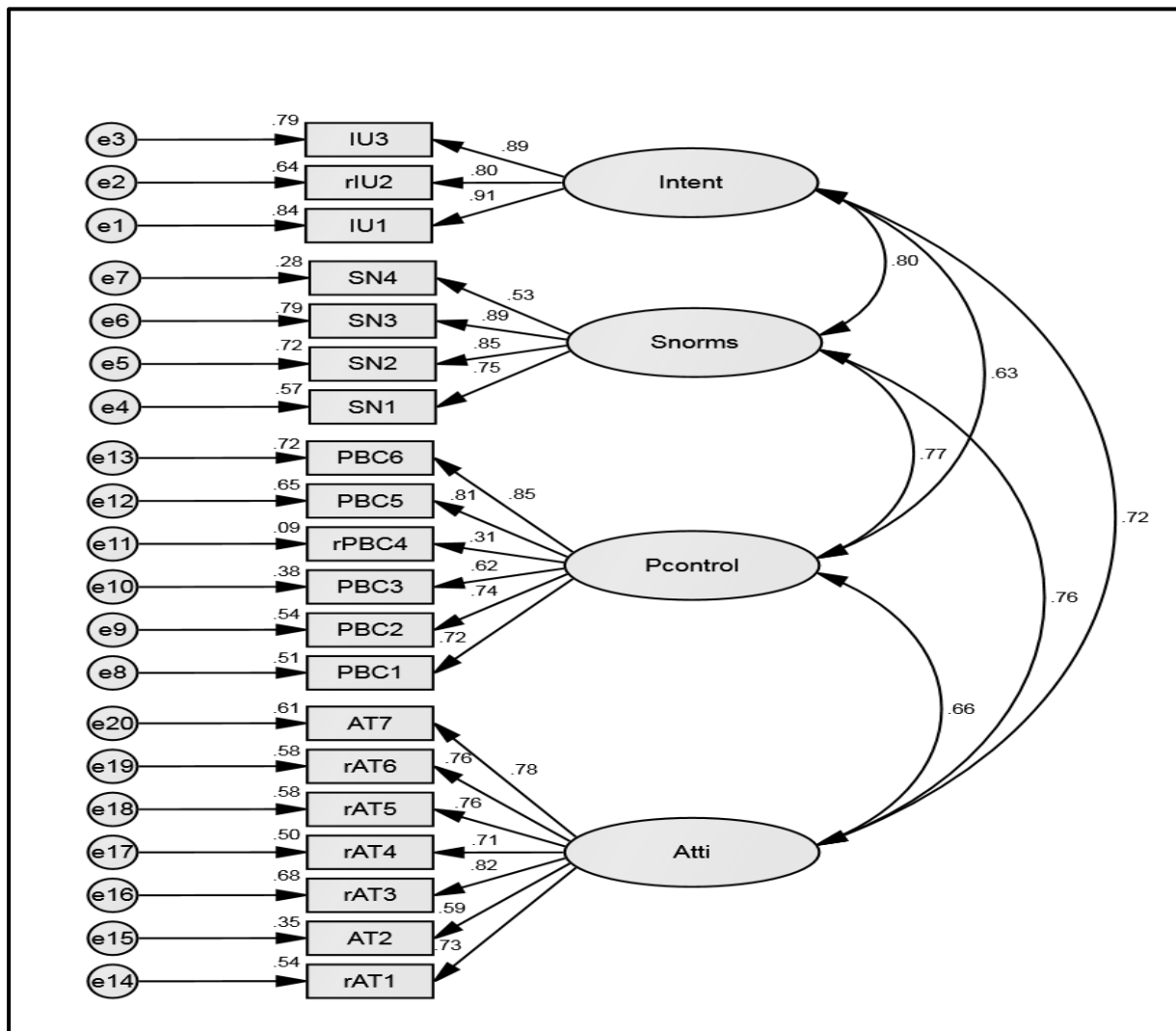


Figure 6.4: Multi-factor measurement model (with standardised estimates)

v. Model modification

The initial CFA results suggest that the multi-factor measurement model provides reasonably good fit; making it suitable to proceed to further examination of the results. However, a scrutiny of the modification indices, standardised residuals and specification search provides the possibility of a better model fit. Turning to the modification indices of AMOS output

reveals a suggested covariance between error terms associated with items PBC2 and PBC3 (e.g., $e_9 \longleftrightarrow e_{10}$) which have the highest modification index (MI) value of 24.936 (Appendix 8). Large MIs argue for the presence of factor cross-loadings and error covariances (Byrne, 2009). Although there are a few other quite large MI values shown, this one stands apart, and represents misspecified error covariance.

Modified model 1

In response to this finding, the initial model (now modified model 1) is modified by adding a covariance between the errors terms of items PBC2 and PBC3. Goodness-of-fit statistics related to modified model 1 reveals that incorporation of this covariance makes an improvement to the model fit. In particular, the overall chi-square value decreases from 404.918 to 378.305 and the RMSEA from .078 to .074, while the CFI value increases from .920 to .929. In assessing the extent to which a respecified model exhibits improvement in fit, it has become customary to compare the differences of model fit indices between two models (Schumacker and Lomax, 2004). As such, the difference in χ^2 ($\Delta\chi^2$) values between the two models is examined. Comparison of modified model 1 ($\chi^2_{(163)} = 378.305$) with initial model ($\chi^2_{(164)} = 404.918$) yields a difference in χ^2 value ($\Delta\chi^2_{(1)}$) of 26.613. The unstandardised estimate for the respecified error covariance parameter is .499, which is significant ($p < .05$) and even larger than the predicted value suggested by the parameter (par) change statistic in the initial model output table.

Turning to the resulting MIs for modified model 1, it is observed that a regression path between two observed variables (e.g., $SN2 \longleftarrow rAT3$), a covariance between error terms and factors (e.g., $e_5 \longleftrightarrow Atti$) and a covariances between two error terms ($e_5 \longleftrightarrow e_{16}$) are suggested. None of these makes any substantive sense. First, a factor (attitudes) cannot be covariate with the error terms of item SN2; second, compared with the other MI values, neither suggested covariance ($SN2 \longleftarrow rAT3$ and $e_5 \longleftrightarrow e_{16}$) show highly exceptional value, and the par change statistics are also insignificant. Therefore, the standardised residual covariances matrix is checked to clearly establish the better model fit.

No standardised residuals are greater than the benchmark range of 2.5 to 4.0 that indicates a problem with one of the measures. However, a few items ($rAT1$, $rAT4$, $rAT6$) of the attitude constructs have more than three residuals with a value of 1 or more, and with comparatively low loadings on attitude constructs. A look back at the modification indices reveals that the

error terms of those items that load on attitude have more suggested covariances between error terms and between error terms and constructs. Therefore, considering the marginal model fit, items rAT1, rAT4 and rAT6 are seen to be candidates for deletion from modified model 1, which is therefore respecified by deleting those items and labelled modified model 2.

Modified model 2

Goodness-of-fit statistics related to modified model 2 again reveal a statistically significant improvement in fit between modified model 2 and modified model 1, with ($\chi^2_{(112)} = 240.734$; $\Delta\chi^2_{(51)} = 137.571$), and substantial differences in the CFI (.947 versus .929) and RMSEA (.069 versus .074) values. However, there is still one suggested covariance between an error term and construct with a fairly large MI (e5 \longleftrightarrow Atti). In reviewing the item associated with the suggested modification, a substantive rationale for its inclusion is not evident and therefore it is not considered for addition to the model. On the other hand, there is a reason to consider the standardised residual covariances again: the item rIU2 (loaded on the intention construct) has more than five residual covariances with other items whose values are greater than at least 1.0. Additionally, the MI indicate the error term (e2) of item rIU2 has a suggested covariance with attitude and four error term covariances. All of these suggest MI values are fairly large; thus it is logical to delete the item rIU2 and respecify as modified model 3.

Modified model 3

Not unexpectedly, goodness-of-fit indices related to modified model 3 show a further statistically significant drop in the chi-square value from that of modified model 2 ($\chi^2_{(97)} = 200.649$; $\Delta\chi^2_{(15)} = 40.085$). Likewise, there are improvements over model 2 in relation to both the RMSEA (.066 versus .069) and the CFI (.953 versus .947). Turning to the MIs, there is still one suggested covariance between the error terms of two items of the attitude construct with fairly large MIs (e15 \longleftrightarrow e16). The error covariance between items rAT2 and rAT3 also suggests redundancy due to content overlap. Item rAT2 asks whether the respondent's attitude toward using 3PL services is useful/useless, whereas item rAT3 asks whether the respondent's attitude toward using 3PL services is good/bad on a seven-point scale. Clearly, there is an overlap of content between these two items. Given this and the fairly large MI, this error covariance parameter is included in the model and respecified as modified model 4.

Modified model 4

Again, modified model 4 reveals a statistically significant improvement in fit, which is ($\chi^2_{(96)}187.433$; $\Delta\chi^2_{(1)} = 13.216$), RMSEA (.063 versus .066) and CFI (.959 versus .953). A summary of the initial and modified models is presented in Table 6.5. The hypothesised model is modified (Figure 6.5) by examined the standardised residuals and the modification indices; thus, it includes two sets of covariance among the error terms of e8-e9 and e15-e16. These two sets show the highest values on the modification indices, which indicates a need for re-specification. The standardised residual matrix also exhibits high values for items rAT1, rAT4, rAT6 and IU2. Thus, for the improvement of model fit those four items are deleted from the hypothesised model. The various indices of overall goodness-of-fit for the model provide sufficient support for the results to be considered an acceptable representation of the hypothesised constructs.

6.2.3.2 Structural model

The process of testing the structural theory is similar to the CFA process. The theory testing with SEM deals with the theoretical relationships between constructs where greater attention is focused on the different types of relationship (Ryu and Jang, 2006). The task of specifying the structural model involves the representation of the theory visually by using a path diagram, clarifying which constructs are exogenous and endogenous, and assessing model validity. As it is hypothesised that the intention to use 3PL services is determined by attitudes, subjective norms, and perceived behavioural control, the primary task in structural model analysis is to replace the correlational relationships found during CFA analysis with structural relationships. This process also involves a series of other changes, such as identification of exogenous and endogenous constructs, the addition of residual values, and other substantive issues (e.g, model identification, degrees of freedom), which are noted below.

- Although no distinction was made among the constructs during multi-factor CFA, attitudes, subjective norms and perceived behavioural control were considered exogenous latent constructs and intention as an endogenous latent construct during structural model estimation. According to TPB, intention is a function of attitudes, subjective norms and perceived behavioural control, and thus is considered endogenous. The endogenous construct in the structural model has one or more arrows depicting structural relationships pointing toward it. The other three constructs are

exogenous according to the theory, and the model therefore has no arrows pointing at them.

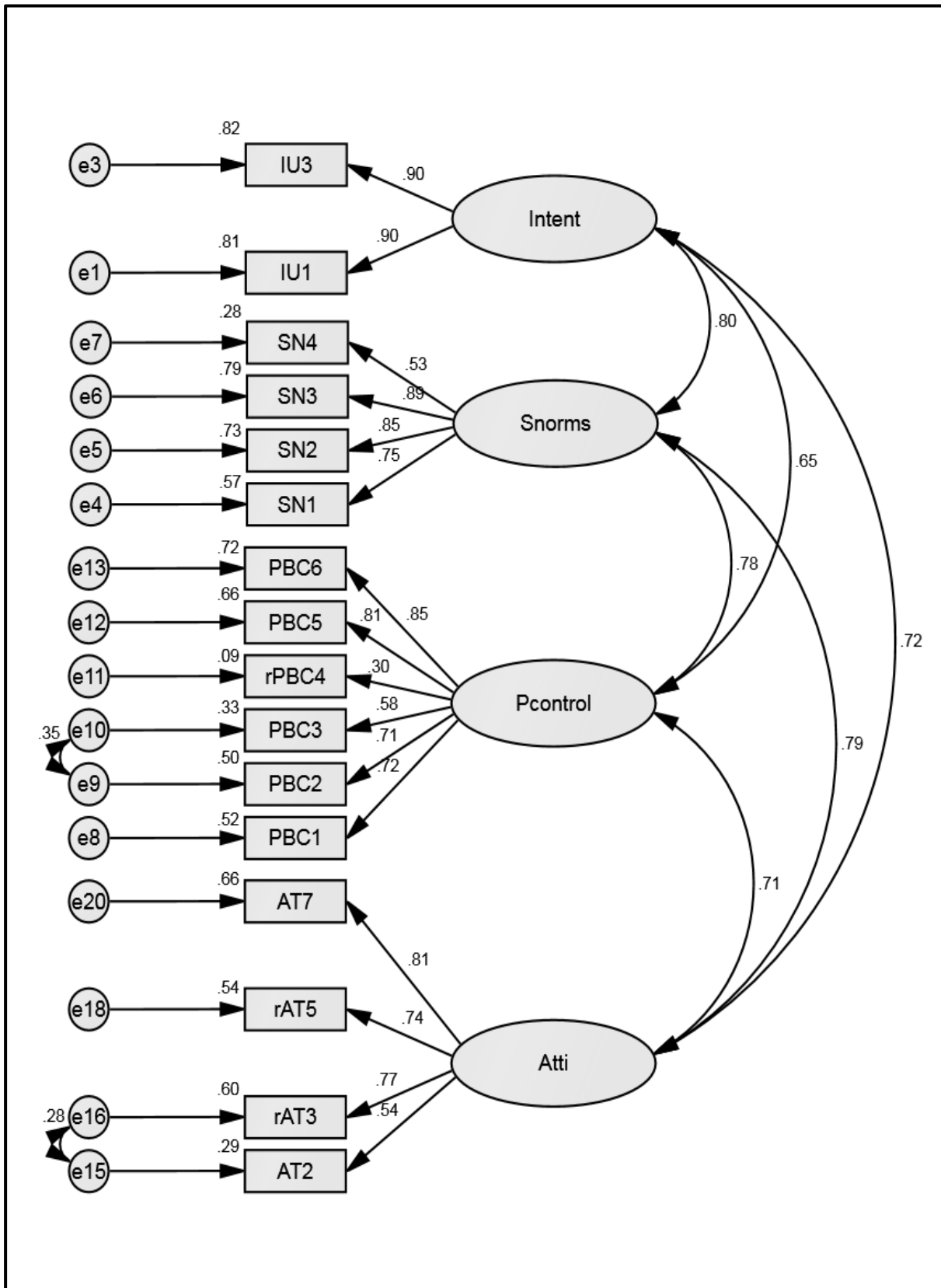


Figure 6.5: Modified multi-factor measurement model

Table 6.5: Summary of goodness-of-fit statistics of multi-factor measurement models

Goodness-of-fit indices	Initial model	Modified model 1	Modified model 2	Modified model 3	Modified model 4
<i>Chi-Square</i>					
Chi-square	404.918	378.305	240.734	200.649	187.433
Degrees of freedom	164	163	112	97	96
Probability level (p > .05)	.000	.000	.000	.000	.000
<i>Absolute Fit Measures</i>					
Goodness-of-fit index (GFI) > 0.9	.856	.865	.894	.908	.913
RMSEA < .05	.078	.074	.069	.066	.063
90 % CL for RMESA	.068 to .088	.064 to .084	.057 to .081	.053 to .079	.049 to .076
The closeness of fit (PCLOSE)	.000	.000	.006	.020	.059
Root mean square residual (RMR)	.116	.108	.103	.098	.093
Normed chi-square < 2	2.496	2.321	2.149	2.069	1.952
<i>Incremental Fit Indices</i>					
Normed fit index (NFI)	.874	.882	.907	.914	.920
Comparative fit index (CFI) > 0.9	.920	.929	.947	.953	.959
Relative fit index (RFI)	.854	.862	.887	.894	.900

- The hypothesised relationship among attitudes, subjective norms and perceived behavioural control includes correlational relationships indicated by three two-headed arrows. The endogenous construct (intention) is not fully explained, and thus associated with an error term (e).
- Computation of the degrees of freedom in a structural model proceeds in the same way as the CFA model. In this regard, there are 136 distinct sample moments, and the number of distinct parameters to be estimated is 40. This reveals the degrees of freedom (136 – 40) 96, which is overidentified. Figure 6.6 shows the structural model corresponding to the modeling framework of intention to use 3PL.

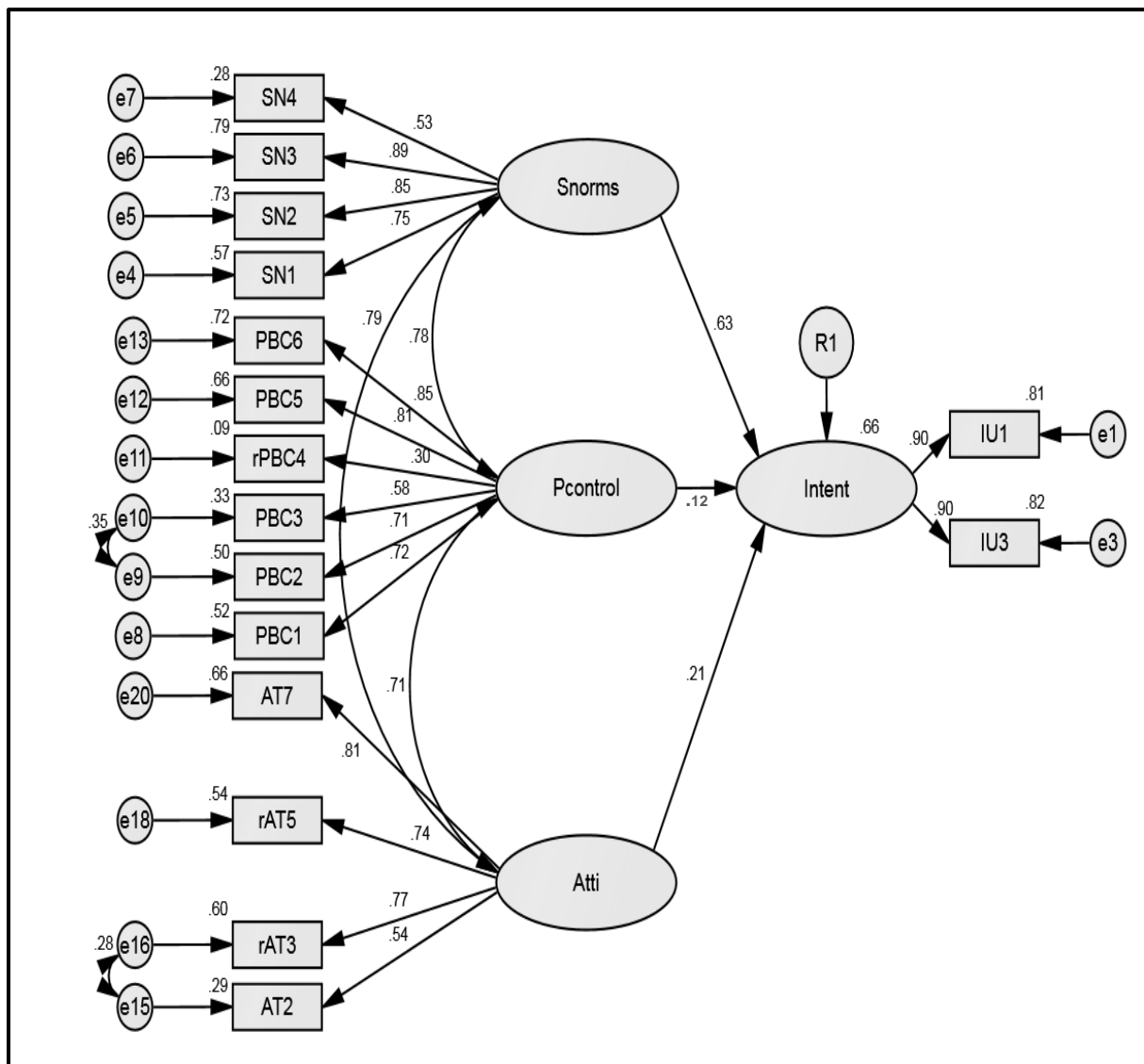


Figure 6.6: Structural model

The structural model in Figure 6.6 is assessed and estimated using AMOS 21. To estimate and assess, the emphasis is on model fit and the consistency of structural relationships with theoretical expectations. The overall fit statistics from testing the model of intention to use 3PL reveal the χ^2 value of 187.433 with 96 degrees of freedom and probability level is .000. The model normed chi-square is 1.952; CFI = .959 with an RMSEA of .063 and a 90% confidence interval of .049 to .076. All these measures are within a range that is associated with good fit. The goodness-of-fit indices suggest that the model provides overall good fit; this does not change from the CFA model. The structural model reveals the same chi-square value as revealed in overall CFA. An examination of the path coefficients and loading estimates confirms that they have not changed substantially from the CFA model. The changes of the estimated standardised loadings are within a range of .01 to .81. However, good fit alone is insufficient to support a proposed structural theory. The hypothesised relationships are expected to be statistically significant and in the predicted direction (Taylor and Todd, 1995a). In this instance, all structural path estimates are found to be significant and in the expected direction.

6.2.4 Step 4: Path model

The path model is the logical extension of multiple regression models, and uses observed variables to measure latent variables. This method is not a method of discovering causes; rather, it tests theoretical relationships (Ryu and Jang, 2006). The path model follows the same five steps of SEM and adheres to certain common drawing conventions used in SEM models. This research includes the analysis of the path model to incorporate the salient belief constructs of the TPB model at this stage. Both direct and indirect measures of the theoretical framework are included in the path model in the drive to predict 3PL use intention, along with identifying the salient beliefs that contribute to attitudes, subjective norms and perceived behavioural control.

6.2.4.1 Path model identification

According to the theory of planned behaviour, three kinds of salient belief are distinguished: behavioural beliefs, assumed to influence attitude toward a behaviour; normative beliefs, constituting the underlying determinants of the subjective norm, and control beliefs, providing the basis for perceptions of behavioural control (Ajzen, 1991). The theoretical framework incorporates these salient beliefs as the prevailing determinants of a respondent's

intention to use 3PL. During CFA, the measurement theory considers only four constructs, but three salient belief constructs need to be incorporated in the path model at this stage. Considerations related to path model identification are as follows:

- Figure 6.7 shows the path model corresponding to the theoretical framework of intention to use 3PL. In the path model, three of the belief constructs (behavioural, normative and control) are considered exogenous latent constructs and the rest (attitudes, subjective norms, perceived behavioural control, intention and 3PL current use) endogenous. All belief constructs are exogenous, based on the theory, and the model therefore has no arrows pointing at them. Attitudes, subjective norms and perceived behavioural control are functions of behavioural, normative and control beliefs respectively, and are therefore endogenous. Intention is a function of attitudes, subjective norms and perceived behavioural control, and 3PL use is a function of intention. Thus both the constructs—intention and 3PL use—are also endogenous.
- The hypothesised relationships of the theoretical framework are all represented as paths and measured by path coefficients. No relationships are shown between three belief constructs and intention or three beliefs constructs and 3PL use, because they are fixed at zero based on the theory and so the model does not hypothesise direct relationships among them. The hypothesised relationship among three belief constructs includes correlational relationships represented by three two-headed arrows. None of these endogenous constructs are fully explained; each is associated with a residual term (e).
- The calculations of the composite scores of belief constructs are different from traditional methods which adopt optimal scaling. The scores of the four direct constructs (intention, subjective norms, perceived behavioural control and attitudes) incorporated in the measurement model and structural model could not be directly imported to the path model for the purpose of path model estimation, and instead composite scores of the four constructs are computed through automated data imputation of the AMOS program prior to the estimation of the path model. Computation of the degrees of freedom in a path model proceeds in the same way as in the CFA model. In this regard, a count of free parameters includes seven path coefficients, five equation error variances, three correlations among the independent

variables and three independent variable variances: a total of 18 free parameters that need to be estimated. The number of distinct values in matrix S is equal to $p(p+1)/2 = 8(8+1)/2 = 36$. There are 36 distinct sample moments and the number of distinct parameters to be estimated is 18. Thus, degrees of freedom $(36-18) = 18$, which is overidentified.

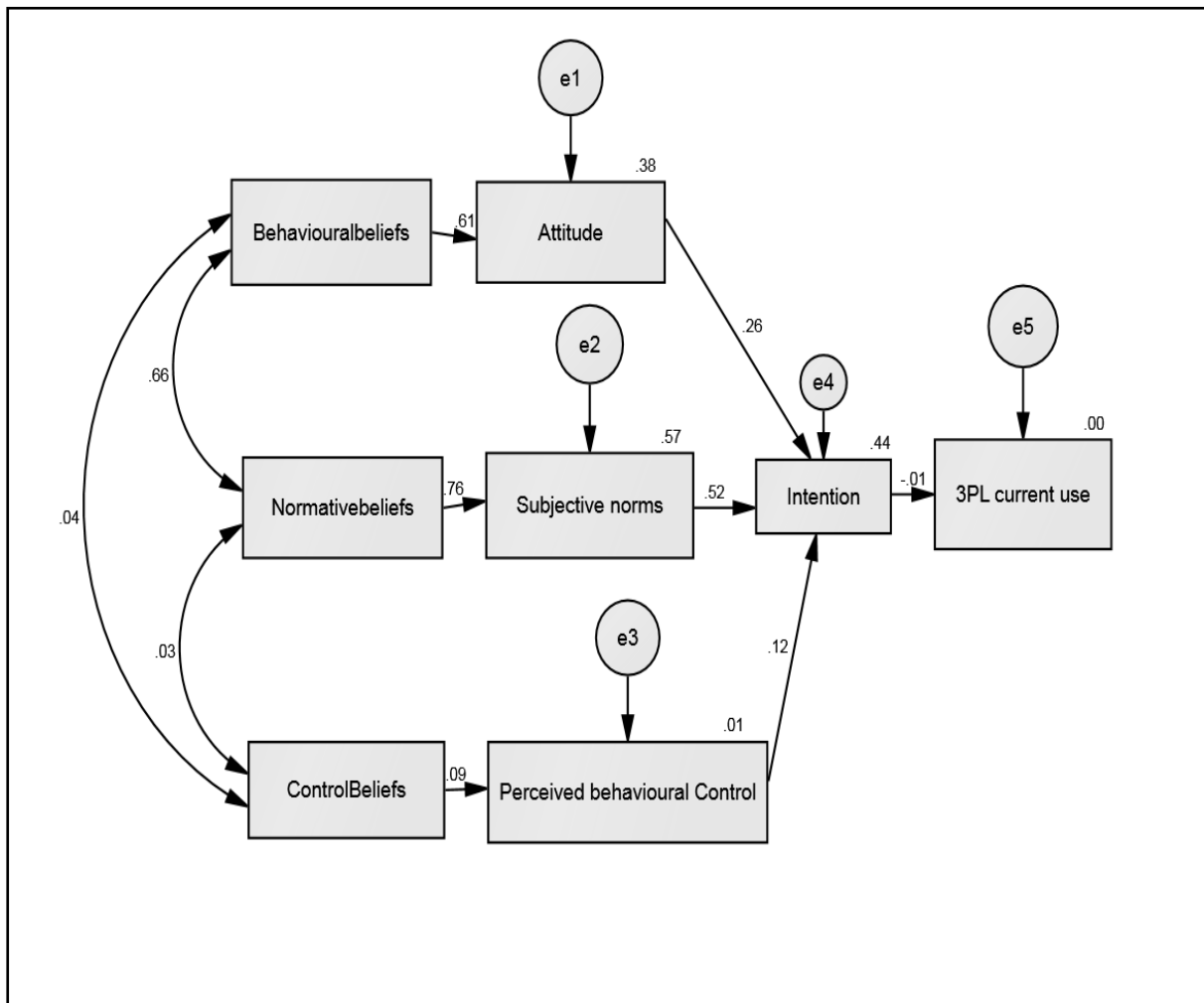


Figure 6.7: Initial path model

6.2.4.2 Path model testing

The path model shown in Figure 6.7 is assessed and estimated using AMOS 21. To estimate and assess, emphasis is given to model fit and the consistency of structural relationships with theoretical expectations. The overall fit statistics from testing the path model reveal an χ^2 value of 589.439 with 18 degrees of freedom and probability level at .000, which is technically a measure of badness of fit. As the p value is small and the χ^2 value is nowhere near the number of degrees of freedom (Fraizier et al., 2004), the initial path model is poorly

specified. The model normed chi-square is 32.747; CFI = .608 with an RMSEA of .362 and a 90% confidence interval of .337 to .388. All of these measures are below the minimum range, and indicate badness of fit. Across this particular set of model fit indices, the conclusion is that the data-to-model fit does not even approach a reasonable level. In the case of poor model fit, unlike SEM analysis there is an option to respecify the path model to achieve a better fit (Vallerand et al., 1992); some modifications might provide a better fit between the sample variance-covariance matrix S and the population variance-covariance matrix Σ .

6.2.4.3 Path model modification

An examination of regression weights reveals that two path coefficients (PBC \leftarrow Control beliefs and 3PL use \leftarrow Intention) are statistically not significant. The covariances of control beliefs with behavioural and normative beliefs are also insignificant. This matches the results of EFA and correlation analysis, where control beliefs is found to be statistically insignificant, lacking validity, and having poor loadings and cross-loadings, and several other fitness issues. Therefore control beliefs, and 3PL current use are deleted from the initial path model.

The deletion of these two constructs and the resulting AMOS output reveal an χ^2 value of 251.387 with 5 degrees of freedom and a probability level of .000. The model's normed chi-square is still very high (50.277) and CFI has increased to .782, with an RMSEA of .451 and a 90% confidence interval of .405 to .500. All of these measures are still below the minimum range except CFI and again remarked as poor fit.

In the search for a reasonable model fit, this research looks back to the modification indices which suggest a regression path from subjective norms to attitudes. The suggested path's par change statistic is .306 and the MI value is large enough to consider respecification of the path model. Moreover, the addition of a path between subjective norms and attitudes does not contradict theory. Therefore, an arrow is added to the model which points toward attitudes from subjective norms. It is now hypothesised that subjective norms are positively related to attitudes, and the respecified model is relabelled as a modified path model.

Goodness-of-fit statistics related to the modified path model (Figure 6.8) reveal a statistically significant improvement in fit between the modified and the initial path models. ($\chi^2_{(4)} = 59.974$); $\Delta\chi^2_{(1)} = 191.413$), and substantial differences occur in the normed chi-square

(14.994 to 50.277), CFI (.951 versus .782) and RMSEA (.240 versus .451) values. There is a substantial change in chi-square value and CFI is above the cut-off value; however, the χ^2 probability is still significant and RMSEA and normed chi-square values are below the cut-off range. It is concluded that the data-to-model fit approaches a reasonable level in comparison with the initial path model. Although the MI suggest the addition of another path from behavioural beliefs to subjective norms, this research does not support including another path in the model. The par change statistics of the suggested path is only .010, indicating that it is very unlikely to significantly improve the model fit. As the suggested path is also not supported by the theory, it is therefore ignored.

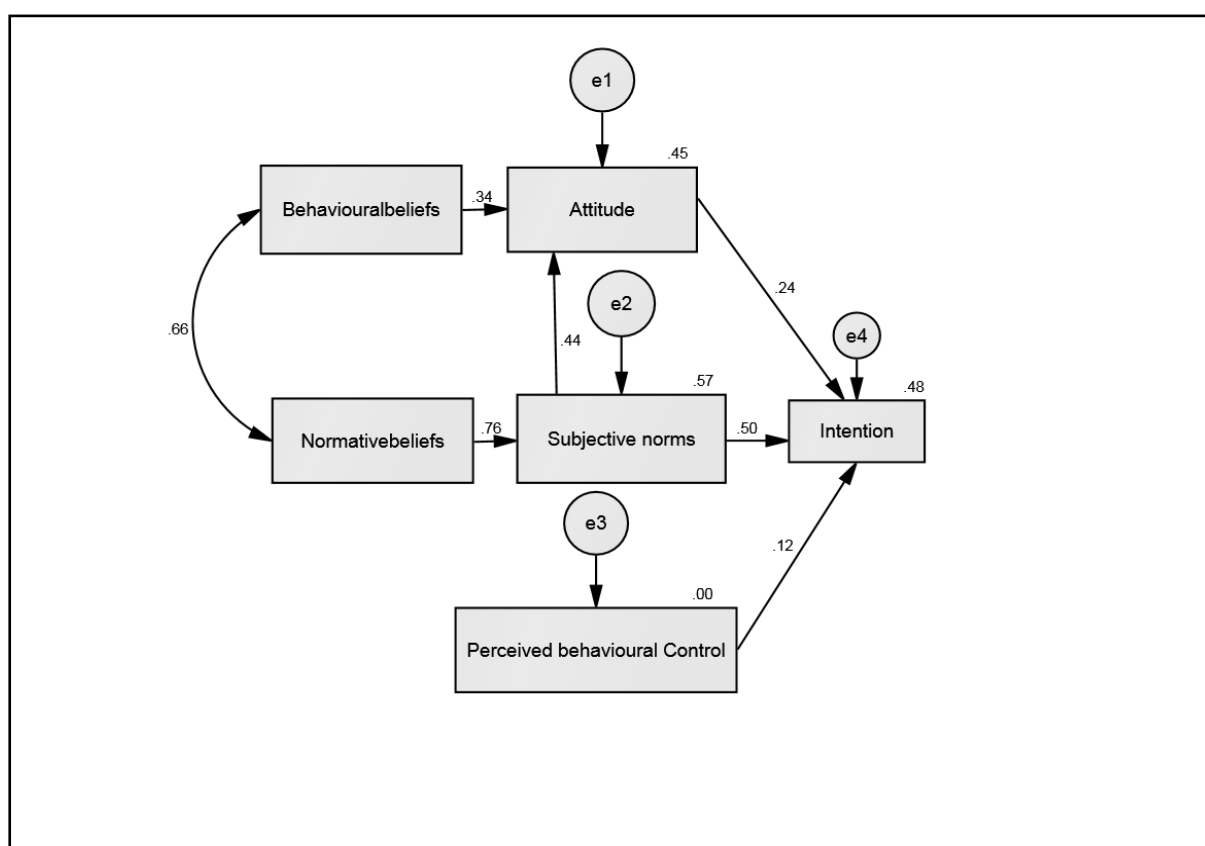


Figure 6.8: Modified path model

6.2.4.4 Hypothesis testing

The results related to the final model are summarised in Table 6.6. The estimates of the standardised coefficients show that the hypothesised relationships between behavioural beliefs and attitudes ($\beta = .341$; $t = 6.221$, $p < 0.01$), and between normative beliefs and subjective norms ($\beta = .755$; $t = 17.921$, $p < 0.01$) are positive and statistically significant. However, control beliefs and perceived behavioural control ($\beta = .086$; $t = 1.339$, $p > 0.01$) are

neither related nor statistically significant. It is concluded that the two structural relationships between behavioural beliefs and attitudes, and normative beliefs and subjective norm, as proposed in the theoretical framework, are supported in this research context.

Table 6.6: Structural parameter estimates of intention to use 3PL model

Structural relationships	t-value	Coefficient (Standardised)	Hypotheses
Behavioural belief to attitude	6.221	.314**	Supported
Normative belief to subjective norm	17.921	.755**	Supported
Control belief to perceived behavioural control	1.339	.086	Not supported
Attitude to intention	4.172	.244**	Supported
Subjective norm to attitude	8.606	.504**	Supported
Perceived behavioural control to intention	2.477	.115**	Supported
Intention to revealed behaviour	.220	.008	Not supported
Subjective norm to attitude	7.947	.436**	Added path

**p< 0.01

The results presented in Table 6.6 reveal positive influences of attitudes ($\beta = .244$; $t = 4.172$, $p < 0.01$) subjective norms ($\beta = .504$; $t = 8.606$, $p < 0.01$) and perceived behavioural control ($\beta = .115$; $t = 2.477$, $p > 0.01$) on intention to use 3PL. This supports that contention that business customers' intention to use 3PL services is positively associated with their evaluation of the consequences of using such services, their feeling of social pressure from important referents, and their perceived behavioural control. It is important to mention that the estimates of the standardised coefficients and t-values show that the direct effect of subjective norms on 3PL use intention is greater than the effects of attitudes or perceived behavioural control.

The results also indicate a positive indirect effect of subjective norms on intention: specifically, subjective norms positively affect intention through attitudes ($p < 0.05$). This suggests that attitudes mediate the relationship between subjective norms and 3PL use intention. Consistent with prior studies (Chang, 1998, Ryu and Jang, 2006), the path added between subjective norms and attitudes during the model modification is positive ($\beta = .436$; $t = 7.947$, $p < 0.01$), indicating the interdependent nature of attitudinal and normative components of TPB in the context of 3PL in Bangladesh.

6.2.5 Step 5: Common method bias

Common method bias refers to a bias in the dataset caused by something external to the measures but which may have influence on the given response (Bagozzi and Yi, 1988). For example, collecting data using a single (common) method such as an online survey may introduce systematic response bias that will either inflate or deflate responses. A study that has a significant common method bias is one in which a majority of variance can be explained by a single factor. Except for the validity check, CFA demands a common method bias test; and this research checks for common method bias in both EFA and CFA.

6.2.5.1 For EFA: Harman's single-factor test

Harman's single-factor test is used to see if the majority of the variance can be explained by one factor. To do this, the number of factors extracted in EFA are constrained to just one factor (rather than extracting via eigenvalues), followed by an examination of the unrotated solution. The assumption is that if common method bias (CMB) is an issue, a single factor will account for the majority of the variance in the model: for example, if the variance is more than 50 per cent then CMB is an issue (Ouellette and Wood, 1998). In this research the variance reveals as 31.155 per cent, quite a way below 50 per cent, and therefore common method bias is not an issue in this research (see Appendix 9).

6.2.5.2 For CFA: Common latent factor

As in CFA analysis a common latent factor (CLF) is used to capture the common variance among all observed variables in the confirmatory factor model, this research adds a common latent factor (as in Appendix 9), and links it to all observed items in the CFA model. A comparison is then made between the standardised regression weights of the model with CLF and those without. It is recommended that, if there are large differences (e.g, greater than 0.2), CLF needs to be retained for computing the composite scores of the factors and transforming the CFA measurement model to the structural model (Bagozzi and Yi, 1988). In this research the comparisons of standardised regression weights of models with and without CLF reveal only two pairs where the difference is large than 0.2. The items are SN4 and rAT3 (Appendix 10). As per the guideline, CLF was retained and the CFA measurement model transformed to the structural model. This was run on AMOS and after a number of iterations (Appendix 11) revealed GOF indices similar to the results of the structural model without a CLF. Table 6.7 shows a comparison of the structural models with and without CLF. It is evident that most of the fit indices have improved, so it can be concluded that structural

model testing with a common latent factor provides a better model fit and CLF captures the common variance among few observed variables in the model.

Table 6.7: Comparison of structural models with and without CLF

Goodness-of-fit indices	Without CLF	With CLF
<i>Chi-square</i>		
Chi-square	187.433	142.779
Degrees of freedom	96	90
Probability level (p > .05)	.000	.000
<i>Absolute fit measures</i>		
Goodness-of-fit index (GFI) > 0.9	0.913	0.933
Root mean square error of approximation < .05	.063	.049
90 % confidence interval for RMSEA	.049 to .076	.033 to .064
Closeness of fit (PCLOSE)	.059	.517
Root mean square residual (RMR)	.093	.087
Normed chi-square < 2	1.952	1.586
<i>Incremental fit indices</i>		
Normed fit index (NFI)	.920	.939
Comparative fit index (CFI) > 0.9	.959	.976
Relative fit index (RFI)	.900	.918

6.2.6 Step 6: Multi-group invariance

This thesis hypothesises that the measurement instruments (attitudes, subjective norms and perceived behavioural control) are invariant across 3PL users and non-users. In seeking evidence of multi-group equivalence, this research seeks to answer two questions. First, do the items comprising the measuring instruments (attitude, subjective norm and PBC) operate in a similar ways across 3PL users and non-users?—in other words, is the measurement model group-invariant? Second, is the factorial structure of a single instrument or of a theoretical construct (e.g, attitudes) equivalent between 3PL user and non-user groups as measured by multiple items? In such instances, equivalence of both the measurement and structural models are of interest.

6.2.6.1 Establishing baseline model

In order to test the invariance of measurement instruments, the respondents are divided into user and non-user groups based on their 3PL use-related revealed behaviour: 153 are classified as 3PL users and the other 90 respondents as non-users, based on the frequency

table. The final modified model during CFA is considered the baseline model and is run for user and non-user groups separately. The findings of the test of the baseline model yield a model fit that is identical for both groups.

6.2.6.2 Testing configural invariance

Consistent with single-group analyses, goodness-of-fit for this multi-group parameterisation is modestly good for both groups. In light of this less than excellent fit to the baseline model for both 3PL users and non-users, it is not expected to achieve better results for this multi-group model. Therefore, it can be argued that configural invariance is satisfied because the basic model structure (i.e. the pattern of fixed and non-fixed parameters) is invariant across groups. If the data do not support such an identical pattern, they will not support more restrictive models subsequently (Bollen, 1989). Having established goodness-of-fit for the configural model, the next step is to test the invariance of measurement and structure across groups.

6.2.6.3 Measurement invariance

The measurement invariance test reveals the fit of this model to be consistent with that of the configural model (CFI = .962; RMSEA = .041). The χ^2 difference test yields $\Delta\chi^2(14) = 000$ and $\Delta\text{CFI} = .003$ (Table 6.8). Since, the χ^2 difference test is non-significance and the ΔCFI value is greater than the .01 cut-off value proposed by Marsh et al. (2004), it can be argued that the measurement model is invariant among groups. While it can be argued that the groups are not different at model level, they can be different for a specific construct; therefore, the next test is for the invariance of all factor loadings in each subscale (i.e., all loadings related to the one particular factor) separately. In this stage, a modification is made to the 'all equally constrained' model (Model 2A in Table 6.8) by removing all factor-loading labels except those associated with intention, and labelling the modified model Model 2B for the purpose of comparison. The results of Model 2B yield a χ^2 value of 374.865 with 193 degrees of freedom. This differential of 1 degree of freedom derives from the equality constraints placed on the two factor loadings (the first loading is already fixed to 1) related to intention construct. Comparison with the configural model yields a $\Delta\chi^2(1)$ value of 000, which is statistically not significant. The results indicate that all items designed to measure intention are operating equivalently across users and non-user of 3PL services, thereby revealing evidence of invariance.

Items that measure subjective norms are tested for invariance. Equality constraints are placed on all freely estimated factor loadings associated with subjective norms, at the same time maintaining equality constraints for intention (model 2C). The test of model 2C yields similar results and reveals evidence of invariance. Sequentially, equal constraint is placed on all freely estimated factor loadings and error variances associated with perceived behavioural control and attitudes (models 2D and 2E respectively). Results related to all these models yield $\Delta\chi^2$ value, which is statistically not significant and below the range of ΔCFI cut-off values.

6.2.6.4 Structural invariance

Given the equivalence of the measurement model, an invariance test is conducted for the structural relationships of the model. The model equally constrains all factor loadings, error variances and the six factor covariances. The final model with equality constraints is presented in Figure 6.9. Results of this test of structural invariance, as reported in Table 6.8, reveal that factor covariances are equivalent across 3PL user and non-user groups.

Table 6.8: GOF statistics for multi-group invariance: a summary (CFA)

Model description	Comparative model	χ^2	df	$\Delta\chi^2$	Δ df	Statistical significance	CFI	Δ CFI
1. Configural model; no equality constrained imposed	-----	374.865	192				.959	
2. Measurement model								
2A. (Model A) All factor loadings constrained equal	2A versus 1	374.865	206	000	14	Not significant (NS)	.962	.003
2B. (Model B) Factor loadings of intention constrained equal	2B versus 1	374.865	193	000	1	NS	.959	.000
2C. (Model C) Factor loadings of intention and subjective norms constrained equally	2C versus 1	374.865	196	000	4	NS	.960	.001
2D. (Model D) Factor loadings of intention, subjective norms and perceived behavioural control constrained equally	2D versus 1	374.865	202	000	10	NS	.961	.002
2E. (Model E) Factor loadings for intention, subjective norms, perceived behavioural control and attitudes constrained equally	2E versus 1	374.865	206	000	14	NS	.962	.003
3. Structural model								
Equal constraints specified for all factor loadings specified for all factors, covariances and two error covariances	3 versus 1	374.865	212	000	20	NS	.963	.004

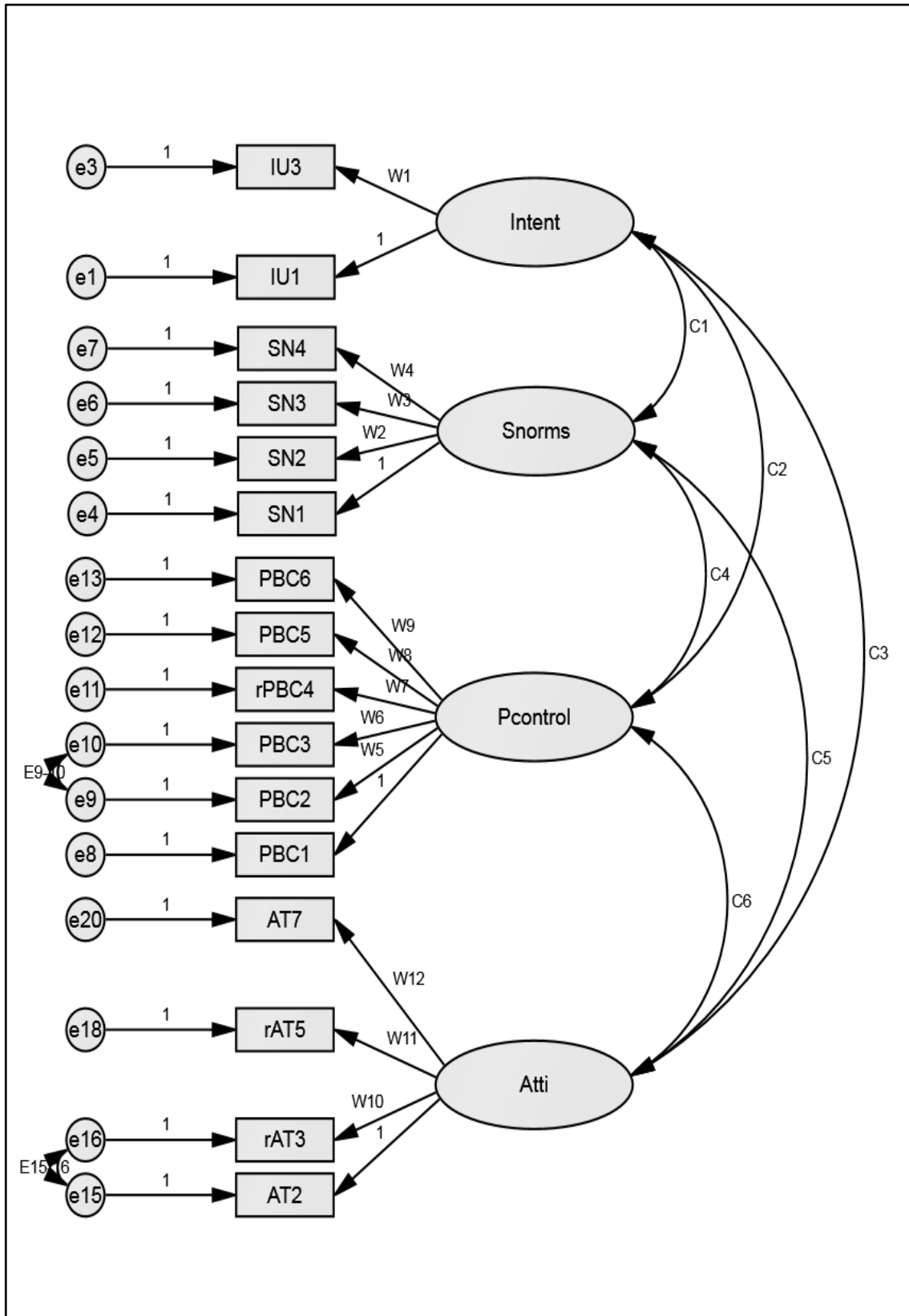


Figure 6.9: Baseline model with equality constraints specified for all factor loadings, covariances and error covariances

6.2.6.5 Path model invariance

This thesis hypothesises that the relationships between predictor constructs of TPB (attitudes, subjective norms and perceived behavioural control) and intention are invariant across 3PL users and non-users. The path model invariance is tested following the same steps used to test measurement and structural model invariance. The final path model (Section 6.2.4) includes both direct and indirect constructs and is used as baseline model; and configural invariance is checked for both groups simultaneously. An equality-constrained model compared with the configural model reveals that the groups are different at model level. Results related to the path model invariance are reported in Table 6.9. An examination of the path-by-path difference test shows that all paths are not statistically significant except the path from normative beliefs to subjective norms. Therefore it can be concluded that the path from normative beliefs to subjective norms is responsible for the model’s differences between 3PL user and non-user groups.

Table 6.9: GOF statistics for multigroup invariance: a summary (path model)

Model description	Comparative model	χ^2	df	$\Delta\chi^2$	Δdf	Statistical significance
1. Configural model; no equality constrained imposed	-----	560.695	18	N/A		N/A
2A. (Model A) All path coefficients constrained equally)	2A versus 1	586.741	23	26.046	5	Significant (variant) at 95%
2B. (Model B) Path coefficient for only behavioural belief to attitude path constrained.	N/A	563.040	19	N/A		Not significant
2C. (Model C) Path coefficient for only normative belief to subjective norm path constrained.		582.196	19			Variant at 95% confidence level
2D. (Model D) Factor loading for attitude to intention path only constrained.		561.262	19			Not significant
2E. (Model E) Path coefficient for subjective norm to intention path only constrained.		560.697	19			Not significant
2F. (Model F) Path coefficient for perceived behavioural control to intention path only constrained		560.707	19			Not significant

6.3 SUMMARY

This chapter identifies the impact of key behavioural factors on the intention to use 3PL and actual 3PL use. Structural equation modeling is used to test the model fit to the data and the hypothesised relationships among constructs; the same technique is used to test the group

differences of 3PL use intention and to check common method bias. Key findings of this research are presented below:

- Attitudes, subjective norms and perceived behavioural control explain 44 per cent of the variance in intention to use 3PL.
- Intention is not reflected in revealed behaviour.
- Respondents' subjective norms are the strongest driver of the intention to use 3PL.
- Behavioural and normative beliefs are revealed as the foundations for predicting attitudes and subjective norms respectively.
- Attitudes mediate the relationship between subjective norms and the intention to use 3PL.
- Measurement instruments are invariant across groups. Group differences, between users and non-users of 3PL, do not have a statistically significant influence on the hypothesised relationships except for the relationship between normative beliefs and subjective norms.

The next chapter will summarise the key findings of this research and discuss the results in relation to the research questions.

CHAPTER 7

DISCUSSION

7.1 INTRODUCTION

The aim of this chapter is to discuss the key findings of this research with relation to the broad research objective. The discussion draws on the results related to current 3PL practices and the modelling framework of the intention to use 3PL in two broad sections: first, current 3PL practices are discussed in conjunction with other country-specific 3PL studies; second, the appropriateness of the theory of planned behaviour (TPB) in explaining business customers' intention to use 3PL services is considered.

7.2 3PL ENVIRONMENT IN BANGLADESH

The export-oriented industrialisation in Bangladesh is aided by competitive unit labour costs in the dominant garment industry and favoured by national regulatory reform (NBU, 2014); the use of third party logistics is critical for its economic development. Industrialisation has already stimulated the growth of freight forwarders and third party logistics providers in the country (Narayanan, 2013), as the large presence of Bangladesh's readymade garments (RMG) sector in the global market has necessitated the use of outbound transportation services for cross-border product delivery. The demands of the export market are reflected in the findings about current 3PL practices, where freight forwarding emerges as the most outsourced service by organisations. Transportation, shipment consolidation, warehousing and inventory are among other important outsourced services. This trend is different than that of developed countries' 3PL use (Appendix 12): for example, warehouse management is the most widely used 3PL service in Australia and the United States (Rahman, 2011, Lieb and Bentz, 2004) and shipment consolidation is the most widely used in Europe (Peters et al., 1998) and outbound transportation in India (Sahay and Mohan, 2006). On the basis of evidence currently available, it seems fair to claim that transportation-related 3PL services dominate in developing nations.

Bangladesh is considered a significant outsourcing alternative for apparel retailers and fashion brands such as H&M, Wal-Mart, GAP, Levi's, Tesco, Zara, Carrefour, JCPenney and many more (BKMEA, 2015). The prominent presence of these top retailers and fashion brands in the Bangladesh readymade garment sector requires the use of 3PL services such as transportation and warehousing for both domestic and international purposes, although different countries have different priorities: organisations in Singapore utilise 3PL mainly for domestic purposes, while Malaysian organisations report using 3PL more extensively for international business (Sohail et al., 2006).

From 1994 to 2013 the average growth rate of GDP in Bangladesh was 5.6 per cent (BNWP, 2015). Against this backdrop of steady growth, the overall structure of the economy has been transforming to a service-based economy in which the traditional share of agriculture has steadily declined and manufacturing and service contribute more and more to the GDP (Ahmed et al., 2009). According to WorldBank (2014), the manufacturing sector now accounts for 27 per cent of the total GDP in Bangladesh, 58 per from the service sector. The current use of 3PL services between the manufacturing and service industries complements the trend of reform from an agro-based to a service-based economy. It is generally assumed that the outsourcing services mostly demanded by manufacturing industries in a developing country context like Bangladesh, but current use of 3PL services is dominated by the service industry. This implies that changing economic patterns in Bangladesh are reflected in the usage of outsourcing services by business customers.

In a developing country, small and medium-sized enterprises (SMEs) are important players in the economy. About 90 per cent of all industries in Bangladesh are SMEs, and they contribute about 25 per cent to the GDP, employ about 31 million people and provide 75 per cent of household income (Hossain et al., 2009). SEMs that use 3PL provided 75 per cent of the total respondents in this survey, demonstrating the prevalence and key role of SEMs to the nation's economic growth. The vast majority of these respondents, predominantly SEMs, made greater use of 3PL services than larger organisations. This is similar to other developing countries such as India (Sahay and Mohan, 2006), but not of developed countries such as Australia (Rahman, 2011).

Compared with the growth of the global 3PL market, Bangladesh is still in the introductory stages of use, commitment to, and allocation of total logistics budgets to 3PL services. Although it is expected that the longer the time of 3PL use, the more the commitment to it—and vice versa (Lieb, 1992)—this is found to be disproportional in the context of Bangladesh. The focus on a global 3PL industry has evolved sequentially from market through segmented, integrated, customer, differentiation and recently consolidation (Papadoppulo and Macbeth, 1998). As the industry matures, global providers continually enhance their ability to drive innovation and create value for their customers. At the same time, customers significantly refine their effectiveness as buyers by enhancing their commitment to 3PL services and allocating greater budgets to outsourcing services (Langley and Capgemini, 2015). According to the 2013 annual 3PL study, 65 per cent of shippers are increasing their use of 3PL services

(Langley and Capgemini, 2013). Despite this international growth, research findings indicate the expenditure on and commitment to 3PL services by organisations in Bangladesh are moderate.

In the mature 3PL industry, users of these services around the world have increasingly shifting their prime motives for outsourcing from cost reduction, emphasis on core business and improved services to operational flexibilities and access to technology, techniques and expertise (Sohal and Rahman, 2013). Bangladesh still considers low costs, accessibility to remote markets and faster delivery as key motives for using 3PL services, because of the dominance of the garment and textile industry in export growth and the comparative advantage of the country's low labour costs. A few negative attitudes pose challenges for 3PL providers in providing logistics opportunities that can play a key role in Bangladesh's efforts to maintain strong growth in exports and logistics-based industries: as already noted, the leakage of competitive information by 3PL providers serving competing companies is a major concern of 3PL users in Bangladesh.

Despite the negative impact of a few 3PL services, the majority of organisations are satisfied with them, which implies the prospect of increased 3PL usage in the future. Increasing satisfaction with the performance of the services is also expected to have a significant positive impact on the level of commitment and willingness of organisations to increase future 3PL use. A vast majority of previous 3PL studies reveal that clients who are satisfied or highly satisfied intend to increase their use of 3PL services from moderate to substantial. In particular, studies by Sohal and Rahman (2013) and Sohail et al. (2006) in both developed and developing countries indicate that more than 80 per cent of 3PL users express an increased interest in the future use of 3PL. It has also been found that the impact of 3PL services is positive when it reduces logistics costs, enhances customer satisfaction and improves logistics system performance: in a ranking of major logistics markets for the future, Bangladesh reached twelfth position in 2013 (NBU, 2014). According to the Agility Emerging Market Logistics Index, Bangladesh is considered one of the 45 major emerging markets of the world (WTO, 2013); there is no compelling reason to deny that all these findings support the view that Bangladesh has the potential to become an emerging global outsourcing destination.

7.3 INTENTION TO USE 3PL

This thesis builds on the theory of planned behaviour (TPB), based on the central theoretical premise that behaviour can be predicted by behavioural intention (Ajzen, 1991, Ajzen and Fishbein, 1980). In the current research, the question under discussion is whether the intention converts into behavioural outcomes. The results related to this question indicate that, although the respondents intend to use 3PL services, their intention is not reflected in their reported behaviour. Although extensive research supports the central premise of TPB, the non-significant relationship between intention and behaviour is not surprising. Fishbein and Ajzen (2010, p. 59) suggest that inconsistency between intention and behaviour exists due to the ‘contradiction between what people say they will do and what they actually do’. Longitudinal studies in different contexts (e.g. such as racial prejudice, exercising and contraceptive use indicate that respondents who did not show their intentions in advance acted accordingly afterwards, but of those who indicated a high level of intention in first study, only half actually acted according to their intentions afterwards (Linn, 1965 in Fishbein and Aizen, 2010). The results of a cross-tabulation between intention to use 3PL and actual use of 3PL reveal that 43 per cent of respondents who showed a high level of intention (e.g. strongly agreed and agreed on a seven-point scale) fell into the category of ‘do not use 3PL’.

The complexity of behaviour of interest, and the context in which a behaviour is performed (hypothetical vs. real situation), also contribute to inconsistency between intention and behaviour (Campbell, 1963 in Fishbein and Aizen, 2010). Results of the study by Armitage and Conner (2001) suggest that TPB accounts for 11 per cent more of the variance in self-reported behaviour than of behaviour measured by observation or actual behaviour. Moreover, the majority of the sample (89 per cent) in this current research expressed limited perceived control of the use of 3PL services, which favours the argument of Ajzen (1991): when there is a serious problem of control, behaviour cannot be predicted by intentions. It is evident that the prevalence of other external factors hinders the translation of intention to actual behavioural outcomes in this instance.

If behaviour is not predicted by intention in the context of 3PL, then a question arises: what leads business customers to form an intention to use 3PL? According to TPB, behavioural intentions are not formed spontaneously; they are the outcomes of attitudes, subjective norms and perceived behavioural control. The current research results indicate that the intention to use 3PL is predictable by these three direct constructs of TPB. These predictor constructs

explained 44 per cent of the variance in intention to use 3PL, in accordance with Sutton (1998), who indicated that TPB explains on average 50 per cent of variance, while Armitage and Conner (2001) reported TPB accounts for a lower rate (27 per cent) of variance in intention; TPB therefore offers a fairly robust explanation of the intention to use 3PL among business customers in Bangladesh. Their intentions are driven by their positive attitudes, perceived peer pressure and perceived behavioural control.

7.3.1 Effect of direct constructs on intention

Given the applicability of TPB in explaining business customers' intention to use 3PL services in Bangladesh, the question under discussion is: what are the effects of attitudes, subjective norms and perceived behavioural control on intention to use 3PL? It is found that the customers who hold a favourable attitude toward 3PL services are more likely to intend to use 3PL services. The literature shows agreement that there is a positive link between attitude and behavioural intention (Ajzen, 1991, Ajzen, 2005, Fielding et al., 2008) in different contexts. Although there has been relatively little research in the logistics context, research on reverse logistics behaviour (e.g. recycling behaviour) also supports the link between attitude and behavioural intention (Tongleta et al., 2004, Valle et al., 2005). The consensus is that there is a positive relationship between business consumers' attitude and their intention to use 3PL. This implies that the more favourable the attitude of business customers toward 3PL services, the stronger their intention to use them.

There is overwhelming evidence confirming the notion that intention is affected not only by attitude but also by subjective norms (Ajzen and Driver, 1991, Astrom and Rise, 2001, Ajzen et al., 2011). The results of this research also indicate that when business partners and managers favour the use of 3PL, their intention to use these services is likely to be positive. This implies that a positive relationship exists between customers' subjective norms and the intention to use 3PL. The revealed positive relationships between attitudes and subjective norms, and the intention to use 3PL, raises the question of which predictor constructs of TPB have more influence in explaining business customers' intentions. This research finds that subjective norms have more influence on the intention to use 3PL than attitudes or perceived behavioural control. Contrary to this result, some studies have found subjective norms to be the weakest predictor of behavioural intention (Armitage and Conner, 2001, Terry et al., 1999). One explanation for this different result is the growing integration and interdependence of logistics and other functional areas of business in Bangladesh. Findings of current 3PL

usage in Bangladesh clearly show multi-functional managers' involvement in the decision or use 3PL; the majority of the organisations involved their marketing managers in the decision along with other functional managers.

The finding that subjective norms are the strongest predictors of intention to use 3PL endorses the study by Alam and Sayuti (2011), which examined the intention-subjective norm of halal food purchasing in a collectivist country context: Malaysia. Their finding is justifiable in this particular context, where people tend to perceive themselves as interdependent with their group and tend to strive for in-group rather than personal goals (Karijin et al., 2007). This is in contrast to individualistic cultures where people are likely to perceive themselves as self-directed and independent of a group, and prioritise personal over collective goals. According to the Geert Hofstede (2015) cultural dimension, western countries such as the United States and Australia score highly on individualism, in comparison to collectivist countries such as Bangladesh: the comparative scores of Australia and Bangladesh are 90 and 20). In individualistic cultures the degree of interdependence a society maintains among its members is low, which leads them to make greater use of personal attitudes than of social norms in behavioural decisions. The implications of the individualism score matches the findings of this research, that subjective norms are important in influencing business customers' intention to use 3PL, especially in Bangladesh, a collectivistic country.

Although the relationship between attitude and subjective norm is not included in the main theoretical grounds of TPB, there is ample support for this relationship (e.g. Chang, 1998, Oliver and Bearden, 1985, Ryu and Jang, 2006, Taylor and Todd, 1995b, Vallerand et al., 1992). This current research validates the view that subjective norms positively affect the intention to use 3PL through attitude. In other words, attitude mediates the relationship between subjective norms and intention to use 3PL. Shimp and Kavas (1984) were among the first researchers to note that attitude had a strong influence on subjective norms in the context of coupon use. Taylor and Todd (1995b) noted a strong influence of subjective norms on consumers' attitudes toward adopting a new product. The addition of this path also increased the explanatory power of intention to use 3PL. In this study, the percentage of variance explained by TPB may increase to as much as 48 per cent when the path from subjective norms to attitude is included. This finding is in accordance with Han et al. (2010) who indicates that the inclusion of a positive indirect effect of subjective norms via attitude on the

intention to visit provides better explanatory power (adjusted $R^2 = 0.591$ vs. 0.592) of the intention to choose an environmentally friendly hotel.

Intention to use 3PL is also determined by perceived behavioural control, which is the third antecedent of the prediction of behavioural intention. Results indicate that business customers who believe that they have the resources or the opportunity to carry out a particular behaviour are more likely to intend to perform that behaviour. This current research finding is consistent with past research by Ajzen (1991) and Fielding et al. (2008), which indicates that there is a link between perceived behavioural control and intention to use 3PL. However, the intention–perceived control link in this research is not as strong as attitude and subjective norm. The reason behind the weak relationship may be the respondents' limited perception of control to use 3PL services. In response to the question of how much control respondents had over their use of 3PL, the average score was 4 on a 7-point scale. Only about ten per cent of respondents chose 6 (agree) or 7 (strongly agree).

7.3.2 Effect of indirect constructs on intention

The prediction of behavioural intention is premised on the assumption that it can be predicted and explained indirectly by belief-based constructs. This view rests on three basic assumptions: first, behavioural beliefs are the foundation of attitude; second, normative beliefs determine subjective norms; and third, control beliefs are the foundation of perceived behavioural control. Results related to the first assumption indicate that business customers who believe that the use of 3PL services will bring cost savings, expert services and faster delivery are more likely to develop a positive attitude toward 3PL. According to TPB, if attitude is completely determined by behavioural beliefs, relatively high correlations should exist; however, the relationship between behavioural beliefs and attitude is in this current research found to be weaker than in previous studies on such topics as leisure behaviour and unethical behaviour. Ajzen (1991) mention several different studies in which the average correlational values are no more than .50 and the relationship between behavioural beliefs and attitudes was weak.

East (1993) explains the reason for these modest correlations: they can occur when there is no precision in a global measure. For example, when attitude toward behaviour is measured by multiple items these can include instrumental (knowledge based) as well as experiential (emotion based) consequences, which may suppress the correlation. Unlike mixing, separate

measurements of instrumental and experiential consequences show improvement in the correlation between product sum and global measure (Ajzen, 1991); the explanation of the weak correlation between behavioural belief and attitude in this current research could be the inclusion of both instrumental and experimental instruments to measure attitude. For example, this study included both instrumental aspects (e.g., 3PL services is reliable) and experiential aspects (e.g., use of 3PL services is comfortable), to reach a global measure of attitude, thereby resulting in moderate correlation.

Results related to the second assumption indicate that if business customers believe that competitors are using or prescribe to 3PL services, their perceived social pressure to use 3PL services is likely to increase. This indicates a likely relationship between normative beliefs and subjective norms, but the strength of the relationship is moderate. A reason for low correlation is related to the scaling used in the research context. Ajzen suggests a need for iterations to find the best scaling to improve the correlations, but East (1993) in his research on investment decision investigated the impact of alternative scaling (combining unipolar and bipolar scale) on the correlation between global and product sum measures and reported that although an improvement in correlation derives from the alternative scaling of global measures, the change of scaling has little effect on product sum measures.

Ajzen and Fishbein have reported the possibility of moderate correlation between normative beliefs and subjective norms in their studies of 1967 and 1970. Ajzen (1991) explains that in some cases the ‘motivation to comply’ measure could not add predictive power and thereby tented to suppress the correlation. He also reports that omitting the measure ‘motivation to comply’ provides a better correlational value between the sum of normative strength and the sum of subjective norm. To verify this explanation, this research also ran a correlation between normative belief strength (omitting the sum of motivation to comply) and subjective norm, and revealed a considerable improvement in the correlation value from moderate to high ($r = .737$). However, the objective of this research is not to investigate the optimal scaling of product sum measures of TPB, but to explain the determinants of intention to use 3PL; Therefore, for further analysis of structural equation modelling both measures, ‘normative belief strength’ and ‘motivation to comply’ have been retained to characterise the product sum measure ‘normative belief’.

The third assumption, of a relationship between control belief and perceived behavioural control, did not hold. This implies that people's beliefs about the resources or opportunities they possess are not related to their perceived behavioural control over the use of 3PL services. This contradicts studies by Ajzen (1991, 2005) where the relationship between control beliefs and perceived behavioural control is found significant. One explanation for this inconsistent result is that the personnel dealing with the supply chain or logistics operations of organisations (the study respondents) are not the only ones involved in 3PL decision making. Overwhelming evidence implies that, as part of a decision-making group, a respondent does not hold the control belief as strongly as is required to correlate with perceived behavioural control. This view is very much in line with that of East (1993), who mentions that correlations may be low for beliefs that are not salient for some people: one person's salient belief could be a non-salient belief of others. Studies relevant to this find smokers and non-smokers hold different salient beliefs (Kristiansen, 1987 in , East, 1993).

A look back at the descriptive results of the items that measure control belief reveals that most respondents return neutral scores for both the control belief measures (strength and power). The prevailing centralised corporate culture of Bangladesh could be one reason behind this neutral response. For example, a majority of the respondents indicated that the 3PL decision originated at the corporate level, which suggests the strategic decision was made mostly at the top level of management. The respondents' logistics responsibilities were identified by functional labels (e.g., transportation, inventory, order fulfilment, freight forwarding, shipment consolidation, packaging, HR recruiting and product assembly) rather than job titles; and it can be argued that although the respondents were directly related to the logistics activities, they did not necessarily have influence in the decision process.

7.3.3 Effect of group differences on intention

The data yielded by this study provides strong evidence of two heterogeneous groups of samples, which raises the question of whether the intention to use 3PL services, explained by direct and indirect measures of TPB in the foregoing discussion, are different between 3PL user and non-user groups. Since subgroups within populations are often heterogeneous with regard to their responses (Steinmetz et al., 2009), an invariance test within a single research context is required. According to the findings, 153 respondents were 3PL users and the rest (90 respondents) non-users. The invariance test helps to ensure that potential differences can be interpreted reliably (Vandenberg and Lance, 2000). The findings suggest that group

differences between users and non-users of 3PL do not have a statically significant influence on the four structural relationships: behavioural belief to attitude; attitude to intention; subjective norm to intention; and perceived behavioural control to intention. In other words, business customers who frequently use 3PL services do not differ in their intention to use 3PL or in their salient behavioural belief about 3PL, attitudes toward 3PL, perceived peer pressure to use 3PL or perceived control over 3PL decisions as compared with non-users.

Han et al. (2010) argue for the equivalence of relationships between TPB constructs and the intention to visit a green hotel, which do not differ across environmentally friendly behaviours (high vs. low); and a study by Laroche et al. (2001) also argues for invariance and indicates that customers who are cautious about recycling activities are not necessarily willing to pay more for purchases of an eco-friendly product; this implies that one's past usage does not necessarily influence their intention in this instance. However, dissenters to this view argue for a significant impact of past experience on behavioural intention (e.g., Albarracín and Wyer, 2000, Kang et al., 2006, Kidwell and Jewell, 2003, Sutton et al., 1999). Further research argues that past experiences provide additional explanatory power to the prediction of intention (Bagozzi et al., 2000). Given the centrality of this group invariance, this study extends previous research on TPB by investigating the impact of group differences of users and non-users on the intention to use 3PL services.

7.4 SUMMARY

This chapter discussed the key research findings. Results related to current 3PL usage revealed that the use of 3PL services has become an accepted way of doing business in Bangladesh. The logistics environment in Bangladesh is in line with developing countries' 3PL usage, and compared with the mature global market use of 3PL is still in the introductory stage. The study tested the applicability of TPB in explaining business customers' intention to use 3PL services in Bangladesh and found it a robust framework. The discussion of research findings provides confirmatory evidence that the intention to use 3PL is not only predicted by attitudes, subjective norms and perceived behavioural control, but also explains the strength of relationships of these with intention. The role of beliefs as the foundation of attitudes, subjective norms and perceived behavioural control has been partially supported in the context of 3PL. The main proposition of TPB, that intention is directly related to attitude,

subjective norm and perceived behavioural controls, which are in turn influenced by their corresponding salient beliefs, is found to be invariant between 3PL users and non-users.

The next chapter will revisit the research objectives in conjunction with key research findings and summarise the contributions of this research from both theoretical and managerial perspectives.

CHAPTER 8

IMPLICATIONS AND CONCLUSION

8.1 INTRODUCTION

This thesis set out to identify and explain the behavioural factors influencing business customers' intention to use 3PL in Bangladesh. To integrate and synthesise the research findings in relation to the research questions and to identify the theoretical and strategic implications of the research, this chapter is structured into five sections. Section 1 presents the key findings. A discussion on how well the research questions underpinning this research are answered is carried out in section 2. Section 3 outlines the major contribution of the thesis, followed by section 4 that highlights strategic implications of the findings for organisations in the context of 3PL in Bangladesh. Final section outlines the key limitations of the research and concludes by identifying areas of future research to extend the scope of behavioural research in the 3PL context.

8.2 KEY RESEARCH FINDINGS

The key research findings associated with current usage of 3PL and intention to use 3PL are succinctly summarised below:

8.2.1 3PL usage in Bangladesh

- 63 per cent of organisations use 3PL services.
- The majority of 3PL users are SMEs and represent the service-based industry.
- 'Freight forwarding' and 'order fulfilment' are the most services, which are frequently outsourced to 3PL service providers.
- Reductions in costs, access to remote markets, and faster delivery are major benefits of outsourcing to 3PL.
- Leakage of competitive information is a major concern of 3PL users.
- Multi-layered hierarchical organisational structure and the highly concentrated power relationship and authority to make decision at the top management level play a key role in 3PL decisions in Bangladesh.
- 3PL use has a positive impact, in improving logistic system performance, enhancing customer satisfaction and reducing logistics costs. The majority of organisations who use 3PL are satisfied with the quality of service delivery.

8.2.2 Intention to use 3PL services

- Attitudes, subjective norms and perceived behavioural control are identified as key drivers, which attest the applicability of the theory of planned behaviour to explain the intention of business customers to use 3PL services in Bangladesh.
- Intention to use 3PL may not necessarily predict an organisation's actual behaviour to use 3PL.
- Organisations are more likely to use 3PL if they perceive to operate under social pressure from stakeholders rather than their own attitudes and perceived control.
- Behavioural and normative beliefs are the foundation for predicting attitudes and subjective norms.
- Attitude is a key mediator that influence the relationship between subjective norms and the intention to use 3PL
- Structural relationships of behavioural belief to attitude, attitude to intention, subjective norm to intention, and perceived behavioural control to intention are statistically insignificant between users and non-users of 3PL service.

8.3 ANSWERING THE RESEARCH QUESTIONS

This thesis aimed to develop a model to identify the behavioural factors that influence business customers' intention to use 3PL services and assess differences of intention between users and non-users of 3PL services in Bangladesh. To achieve this broad aim, four key interrelated research questions were developed, and answered in different chapters of this thesis. Chapter 5 specifically addressed the first research question: *What is the current status of 3PL practices and the 3PL decision-making environment in Bangladesh?* This question is been answered by reporting the outputs from descriptive statistics relating to the extent of current 3PL usage, organisational factors affecting 3PL decisions, and the impact of 3PL usage in the country. The majority of organisations in Bangladesh use 3PL and consider it an accepted way of doing business. The results reveal that 3PL practices in Bangladesh are similar to those practiced in developing countries. However, there are still opportunities to expand the wider adoption of 3PL outsourcing as a strategic tool to achieve efficiency or responsiveness. The 3PL decision-making environment is mostly characterised by the hierarchical structure of the organisations, where decisions are taken and implemented through a command and control. The decision to use 3PL is mostly interdependent and centralised but is generally determined by top management. Nevertheless the influences of managers from other organisational levels are still recurrent. The

majority of organisations noted the positive impact of 3PL on the overall performance of their logistics systems. They also indicated their intention or plan to increase 3PL use in the future.

The other three research questions were tackled in Chapter 6, using structural equation modelling. The second research question, *Do attitudes, subjective norms and perceived behavioural control predict the intention of business customers to use 3PL service?* was answered by applying the theory of planned behaviour as a modelling framework. The results show that the TPB model is a good fit to the data, thus a valid framework to explain the intention to use 3PL by business customers in Bangladesh. 3PL decision makers have positive attitudes toward 3PL services and however they experience significant social pressure from their stakeholders to use them. However they perceive themselves as having limited autonomy and capacity to initiate any 3PL decision. The results also provide substantial support for TPB as a way of identifying the salient behavioural beliefs and normative beliefs relevant to 3PL decision making, although the exact nature of the relationship between beliefs and its corresponding predictive constructs remain contentious. Nonetheless, the overall results indicate that the intention to use 3PL services is predictable by attitudes, subjective norms and perceived behavioural control.

The third research question, *Does the intention to use 3PL services translated into the actual 3PL use?* was addressed using a path model diagram. The results indicated that behavioural intention is not translated into revealed behaviour. Over two thirds of organisations reported that they use multiple 3PL services from more than one provider, but their reported usage of 3PL did not correlate with their intention to use. This pattern is an indication of the literal intention–behaviour gap, especially when organisations express intention regarding a complex decision in a hypothetical situation. This indicates that responding in a hypothetical situation (such as answering the questionnaire), than the real situation (where the respondents actually performed) can be different. The verbal and overt responses toward behaviour in an underlying hypothetical disposition may be more difficult to perform than the other. Overall, the results imply that, on a questionnaire, organisations may express an intention to use 3PL, but when they encounter a real-life situation their perceptions may change and produce a different behavioural outcome. In regard to this research question it is evident that although a considerable portion of the respondents intended to use 3PL services, this did not match with their revealed behaviour.

The fourth and the final research question, *Does the intention to use 3PL vary between users and non-users?* was answered by testing the behavioural model through a multi-group invariance test. Results revealed that TPB instruments are invariant across 3PL user and non-user groups.

Specifically, the measurement instruments of attitudes, subjective norms and perceived behavioural control were found to be invariant across users and non-users. This suggests that 20 items that measure six constructs of TPB are comparable between the groups. Moreover, group differences have insignificant effect on the structural relationships (such as, behavioural belief to attitude, attitude to intention, subjective norms to intention and perceived behavioural control to intention) that are found to be significant before while answering research question 2, except the relationship between normative beliefs and subjective norms. Overall, the multigroup invariance test results suggest that the intention to use 3PL services does not vary between user and non-user groups of 3PL.

In light of the above, the primary objective of this thesis to develop a model to identify the behavioural factors that influence business customers' intention to use 3PL services and assessing the impact of group differences in 3PL decisions in the context of Bangladesh has been fully achieved.

8.4 CONTRIBUTION OF THE STUDY

This study has made significant contribution in four key areas. These include:

Firstly, this thesis developed a model and suggesting empirical evidence to inform managerial implications towards more informed outsourcing decision. Throughout the study there was the aim of contributing to the overall body of literature in this field. The theory of planned behaviour is applied, for the first time, in the context of Bangladesh to explain the intention to use 3PL services. The TPB provided a robust framework to explain behavioural factors that impacted on the intention to use 3PL services among business customers. The results provide further insights onto the role of behavioural factors in outsourcing decisions, and highlight the validity of Ajzen's theory of planned behaviour for organisational research. With regard to the specific contribution, there had not been any previous significant research into the attitudes of business customers towards the use of 3PL services, the perceived social pressure and perceive control to take the decisions to use 3PL services.

Secondly, this is the first comprehensive research that investigated business customers' beliefs (i.e. behavioural, normative and control) in the 3PL context in Bangladesh. Various behavioural theories were applied in logistics literature which was discussed in chapter 3. For example, Plant (2009) employed TPB to analyse the attitudes of road freight operators and

the barriers to collaborative activity in the context of road freight industry in the United Kingdom. No such analysis or examination had taken place in 3PL context, nor had any previous study attempted to generate commonly held beliefs regarding 3PL services that contribute to form the intention of the business customers to use 3PL services. Lower cost, faster delivery and focus on core business are considered as the general motives to use 3PL services, regardless of contextual differences however, it cannot be claimed with certainty that they contribute equally to the formation of business customers' belief systems in every context (e.g. India and Australia). Ajzen and Fishbein (1980) correctly suggest that new sets of beliefs and salient referents should be elicited for each new context and population; and the contextual beliefs elicited in this research was a novel approach, as there had been no previous research attempts to extracting the salient beliefs contribute to the knowledge base and the understanding of the function of business customers' salient beliefs in building their attitudes and perceptions toward 3PL in the context of Bangladesh.

Thirdly, the study has advanced knowledge and supported the argument of Chang (1998), Han et al. (2010), Oliver and Bearden (1985), Ryu and Jang (2006), Taylor and Todd (1995b) and Vallerand et al. (1992) who suggested the addition of a relationship between the attitudinal and normative components of the TPB model. The study has provided strong support for the use of interdependence relationship between attitude and subjective norms in further TPB research.

Finally, this study has analysed 3PL usage in Bangladesh, which has previously been confined to few independent individual companies' or survey reports. This research quantified the extent of 3PL usage, the 3PL decision-making process, and the benefits and limitations of 3PL in Bangladesh. This is the first study that has collected and collated data on 3PL practices in such a way to enable comparing results with other developing and developed countries, thereby filling a gap in logistics research in Bangladesh first indicated by Razzaque (1997).

8.5 STRATEGIC IMPLICATIONS

The key practical implications of this research finding are related to current 3PL practices and the intention to use 3PL.

8.5.1 Current 3PL practices

Results from the analysis related to current 3PL practices enable decision-makers to benchmark their organisation's use of 3PL against other organisations and in different countries. Being a significant outsourcing alternative for apparel retailers and fashion brands Bangladeshi organisations is mostly outsourcing freight forwarding services from 3PL providers. This usage trend is different when it is compared to the usage of developed countries. For example, warehouse management is the most widely used 3PL service in Australia and USA (Rahman, 2011, Lieb and Bentz, 2004) and shipment consolidate is the most widely used 3PL service in Europe (Peters et al., 1998b). Therefore, this research provide a fact base evidence to 3PL providers to decide what new services to introduce and what existing services to streamline to match the world outsourcing demand. The 3PL in Bangladesh is used as widely as in other developing countries, which suggests that it is not an issue for organisations in terms of affecting their efficiency and performance in Bangladesh. However, the levels of use is rather limited compared with more developed countries such as Australia, the United Kingdom and the United States, which shows the opportunity to harness the potential benefits of 3PL such as cost savings, accessibility to remote market, shorter lead time and flexibility. The benefits and constraints of 3PL usage can help 3PL service providers to devise and deploy strategies to tackle the challenges or harness the potential of untapped potential.

The results relating to the current use of 3PL services, the intention to use 3PL and the attitudes toward 3PL services across different industry provide evidence base to help 3PL providers formulate differentiation strategies to adapt the industry-specific requirements. Organisations should then determine the needs of different segments (e.g. of the manufacturing vs. the service industry, or of small vs. large organisations) or classify customers into the key market segments based on needs, attitudes and behaviour. For example, services such as shipment consolidation, freight forwarding, warehouse management and packaging services should be designed to by considering the requirements of the manufacturing industry. On the other hand, order fulfilment, logistics information system, product returns and HR recruiting should be customised for the service industry. This will help organisations to design and deploy different logistics service offerings and marketing approaches tailored for each segment or a mix of services for each segment. This will then enable organisations to improve their competitive advantage and to help position Bangladesh as an emerging outsourcing destination.

8.5.2 Drivers of 3PL use intention

Key drivers of the decision to use 3PL services were successfully identified. The key findings will help organisation building strategic intelligence to improve decision process and for change behaviour in three different ways.

First, using the findings related to attitudes toward 3PL, a collaborative strategy such as two-way communication or improved information sharing between 3PL providers and their clients can be adopted to create positive attitude towards augmenting the business environment. This will aid in overcoming the difficulties that may arise because of negative attitudes (e.g. that 3PL use leads to lack of control over business operations or to leakage of competitive information) or lack of trust. By engaging in two-way communication with clients, and responding positively to suggestions and complaints as well as conveying important information, positive attitudes toward their business can be fostered to help improve client relationships.

Second, the findings show that normative pressure plays a predominant role in forming the intention to use 3PL. This possibly suggests that the interdependence of an organisation decision-making mechanism undermine the capacity and autonomy of supply chain managers to outsource business functions to 3PL. The lack of confidence and independence that managers have expressed may indicate their mute representation in the decision process rather than their active engagement in the decision to use 3PL. One strategy is to empower employees to help strengthening their confidence and belief in their capacity to determine evidence-based prudential decisions for organisation. This will potentially lead to increased self-motivation and a sense of independence. Furthermore, this will also minimise the effect of perceived social pressure in making those decisions.

Finally, since the intention to use 3PL outsourcing does not vary between users and non-users, different communication strategies should be formulated by government or industry bodies to influence peoples' attitudes and behaviours. It is recommended that the agencies such as the Bangladesh Supply Chain Society (BSCS) could conduct training workshops to promote three key characteristics to adopt a new behaviour. First, aware the prospective business customers about the relative advantage of adopting 3PL services over in house business operations. Second, provides customised 3PL services that are compatible with business customer's

existing business processes. Third, to minimise the perceived complexity of adopting 3PL services over in house activities, need to promote greater awareness of the benefits of 3PL use to non-users (e.g. low transportation costs, focus on core business, shorter lead time) as well as the perceived constraints (e.g. lack of control over business operations) of outsourcing business functions to 3PL providers.

8.6 LIMITATIONS AND FURTHER RESEARCH

This thesis has developed a behavioural model to examine the factors influencing intention to use 3PL, and has tested it in Bangladesh. Despite the theoretical methodological robustness, there are a number of limitations which need to be highlighted to provide opportunities for future research.

First limitation of, this study is data are collected from a broad range of industries which might respond differently to the use of 3PL. Generalising the results however could vary across different industries. This study is designed to examine how general business customers develop their intention to use 3PL services. Different groups of business customer may have different decision-making processes: for example, auto parts retailers' use of 3PL services may not be similar to auto manufacturers. Further analysis that examines the differences in the use of 3PL across different industries should be carried out. Future research should therefore test the model using a homogeneous sample from a single industry (e.g. garments/pharmaceuticals/cottage) that will help reduce extraneous variance and increase internal validity.

Second limitation is the gap that being identified between respondents' intention to use 3PL service and the reported revealed behaviour. Inconsistency between intention and behaviour can be observed in more literal sense. The explanation of this literal inconsistency was offered by Donald Campbell (1963), who suggested that observed discrepancies between words and deeds may often be more apparent than real. This indicates the presence of other external factors that may hinder the translation of intention into actual behavioural outcomes. Further research could include actual controls (e.g., skills and resources) as an additional construct and some background variables (e.g., length of 3PL use or budget commitment to 3PL) to test the sufficiency of TPB to predict behavioural outcomes accurately in the context of outsourcing.

Final limitation in this study is that the TACT elements (Target, Action, Context, and Time) are defined somewhat arbitrarily. In order to have predictive validity, both the intention and the behaviour must be measured with the same degree of specificity in relation to TACT. In this study, for example, a time frame (e.g., within three months or within a year) was not used when assessing business customers' intention to use 3PL services. This was because not specifying a timeframe makes it relatively easy for survey participants to respond (Ajzen, 2002). Consideration of this issue is strongly recommended for future study. For instance, the use of a phrase such as 'on my next use of outsourcing' instead of a predefined time frame in the questionnaire might be an effective way to deal with this issue.

8.7 CONCLUSION

The integration of behavioural research using the theory of planned behaviour to explain business customers' intention to use 3PL services in Bangladesh lies at the centre of this thesis. The theory of planned behaviour in the 3PL context is founded on the prime assumption that actual 3PL use can be predicted by the intention. The results of behavioural modelling confirm that all direct constructs of TPB: attitudes, subjective norms, and perceived behavioural control, are underlying drivers underpinning the decision to use 3PL services. It also partially confirms the vital role of belief constructs (behavioural, normative and control) in the formation of intention to use 3PL. All relationships of the behavioural model except for control beliefs and perceived behavioural control are supported. There is no difference between users and non-users in the way they form their intentions. They express similar attitudes to and perceptions of 3PL services.

Improved understanding of the behavioural factors contributing to intention formation in the 3PL context in Bangladesh can help organisations to develop strategies to improve the 3PL decision-making process. Collaborative working environment and the empowerment of employees are suggested as strategies to improve 3PL decision making process. This research contributes to the existing 3PL literature by providing a comprehensive description of the 3PL environment in Bangladesh. This provides an information base which prospective 3PL users around the world can use to compare the logistics and supply chain practices of Bangladesh with other developing countries, and fills a previously untapped gap in logistics research in Bangladesh.

Behavioural factors and their impact on the decision process also offer significant clarity of the prevailing and persistent intention–behaviour research gap. The benefits of investigating behavioural factors and their impact on the intention to use 3PL services in Bangladesh have shown to be comprehensive and justifiable in providing a better understanding of 3PL decision making. An improved 3PL environment, coupled with further improvements to the infrastructure, will attract more organisations to use 3PL service in Bangladesh for promoting domestic and international business. This will aid to the long-term development of the logistics-based industry and identify the trajectory for Bangladesh to become a major global outsourcing destination.

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APPENDICES

Appendix 1: Measurement scales and constructs of TPB

Items	Scale type 7 point Likert scale	Item descriptions	Constructs
IU1	Strongly disagree--- -----strongly agree	I would like to use 3PL services	Intention (IU)
IU2		I do not intend to use 3PL services.	
IU3		I intend to use 3PL services.	
AT1	Bipolar (1-7)	Overall, my attitude toward using third party logistics (3PL) services to fulfil the supply requirements of the business is- Favourable--Unfavourable.	Attitude (AT)
AT2		Useless-Useful	
AT3		Good-Bad	
AT4		Pleasant-Unpleasant	
AT5		Reliable-Unreliable	
AT6		Valuable-Worthless	
AT7		Negative-Positive	
SN1	Different anchor (1-7)	What percentage of business people that you considered important are using...0%-----100%	Subjective norms (SN)
SN2		It is expected from me that I use 3PL services Strongly disagree-----strongly agree	
SN3		Most people who are important to me in 3PL decision making want me to use 3PL services Strongly disagree-----strongly agree	
SN4		I pressured from peers (e.g., suppliers, retailers) to use 3PL services Strongly disagree-----strongly agree	
PBC1	Different anchor (1-7)	If I want to, I can easily use 3PL services Strongly disagree-----strongly agree	Perceived Behavioural control (PBC)
PBC2		Overall, how much control do you have over your use of 3PL services No control-----complete control	
PBC3		It is mostly up to me whether or not I use 3PL services Not at all true-----very true	
PBC4		The decision to use 3PL services to fulfil the supply requirements of business is beyond my control. Strongly disagree-----strongly agree (-ve)	
PBC5		How confident are you that you will be able to use 3PL services Not at all confident-----extremely confident	
PBC6		It is easy for me to use 3PL services Not at all true-----very true	
BBS1	Extremely unlikely- ----- Extremely likely	If I use 3PL services to fulfil the supply requirements of the business, it will-----	Behavioural belief strength (BBS)
BBS2		Reducing business costs	
BBS3		Expert services	
BBS4		Faster execution	
BBS5		Cause information leakage Lack of control over business operations	

BBS6		Documentation problem	
BBS7		Opportunities for fraudulent activities	
	Extremely undesirable----- Extremely desirable	Please rate the following statements according to your desirability/undesirability of using 3PL services to fulfil the supply requirements of the business-----	Outcome of evaluations (OE)
OE1		Cost reduction by using 3PL services is	
OE2		Receive expert service by using 3PL services is	
OE3		Faster execution by using 3pl services is	
OE4		Information leakage due to 3PL use is	
OE5		Loss of control over business operations due to 3PL use is	
OE6		Frequent documentation problems due to 3PL use are	
OE7		Fraudulent activities due to 3PL use are	
	Strongly disagree--- ----- strongly agree	Please rate your agreement/disagreement regarding other business people's influences on your use of 3PL services to fulfil the supply requirements of the business from the followings-----	Normative belief strength (NBS)
NBS1		Company management think that i should use	
NBS2		Company Partners think that i should use	
NBS3		Other business people are using	
MC1	Not at all ----- very much	How much do you care about what management think/do	Motivation to comply (MC)
MC2		How much do you care about what Business partners think/do	
MC3		How much do you care about what other business people think/do	
	Very rarely----- very frequently	While fulfilling the supply requirements of the business by using 3PL services-----	Control belief strength (CBS)
CBS1		How often do you encounter the problem of inefficient time management?	
CBS2		How often do you face conflicts among members of the management committee?	
CBS3		How often do you need to deal with the problem of improper documentation	
CBS4		How often do you enjoy the benefit of large and specialized manpower	
CBS5		How often do you get the benefit of more market accessibility?	
CBP1	Very difficult----- - very easy	Please indicate your level of difficulties/easiness if you encounter the problem of inefficient time management.	Control belief power (CBP)
CBP2		face conflicts among members of the management committee	
CBP3		encounter the problem of improper documentation	
CBP4		do not get the benefit of large and specialized manpower	
CBP5		think that the 3PL provider is unable to access more markets.	

Appendix 2: Questions related to 3PL environment in Bangladesh

1. Which of the following category best describes your employment status?

- | | |
|--|--|
| <input type="checkbox"/> Chairman | <input type="checkbox"/> Vice President |
| <input type="checkbox"/> Vice Chairman | <input type="checkbox"/> General Manager |
| <input type="checkbox"/> Managing Director | <input type="checkbox"/> Asst. General Manager |

- | | |
|--|---|
| <input type="checkbox"/> Chief Manager | <input type="checkbox"/> Business executive |
| <input type="checkbox"/> Manager | <input type="checkbox"/> Associate Business executive |
| <input type="checkbox"/> Asst. Manager | <input type="checkbox"/> Supply chain executive |

2. Which of the following category best describes the industry where you are currently working?

- | | |
|---|---|
| <input type="checkbox"/> Garments and textile | <input type="checkbox"/> Banking & financial institutions |
| <input type="checkbox"/> Telecommunications | <input type="checkbox"/> Information technology |
| <input type="checkbox"/> Pharmaceuticals | <input type="checkbox"/> Health services |
| <input type="checkbox"/> Cement and ceramic | <input type="checkbox"/> Media services |
| <input type="checkbox"/> Agro-business | <input type="checkbox"/> Real estate |
| <input type="checkbox"/> Frozen foods | <input type="checkbox"/> Tourism |
| <input type="checkbox"/> Transportation | <input type="checkbox"/> Education |

3. Please indicate the number of employees of your organization from the followings

- | | |
|----------------------------------|------------------------------------|
| <input type="checkbox"/> 1-100 | <input type="checkbox"/> 501-1000 |
| <input type="checkbox"/> 101-500 | <input type="checkbox"/> Over 1000 |

4. Do you use Third-Party Logistic (3PL) services to fulfil the supply requirements in retail business?

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No |
|------------------------------|-----------------------------|

5. Please indicate how long your company is using 3PL services?

- | | |
|---|--|
| <input type="checkbox"/> Less than 1 year | <input type="checkbox"/> More than 3 years |
| <input type="checkbox"/> One to 3 years | <input type="checkbox"/> More than 5 years |

6. Please indicate how your organization become aware about the use of 3PL services (you can select more than one methods)

- | | |
|--|--|
| <input type="checkbox"/> Discussion with other logistics professionals | <input type="checkbox"/> Advertisement in professional publication |
| <input type="checkbox"/> Sales call by third-party representative | <input type="checkbox"/> Direct mail advertising |
| <input type="checkbox"/> Sales contacts | <input type="checkbox"/> Other |

7. Please indicate which of the following logistics functions of your organizations are outsourced to 3PL provider (you can select more than one function)

- Shipment consolidation
- Warehouse management
- Fleet management/operations
- Product returns
- Carrier selection
- Packaging/repacking
- Logistic information systems
- Order fulfilment
- Product assembly/installation
- Order processing
- Customer spare parts
- Freight forwarding
- HR recruiting
- Inventory management

8. Please indicate which of the following organizational level took the strategic decision to use third-party logistics services

- Corporate level
- Divisional level
- Local level
- Multiple 3PL programs at different organizational level

9. Please indicate which of the following managers are involved in the decision to use 3PL services (you can select more than one function)

- Finance manager
- Manufacturing manager
- Marketing manager
- Information system manager
- Human resource management manager
- Field service manager
- Legal manager
- Purchasing manager

10. Please rank the following factors according to its positive impact on your use of 3PL services (assign 1 to the most important factor and 7 to the least important factor)

- Low cost
- Faster delivery
- Savings of time
- Accessibility to latest technology
- Accessibility to remote market
- Specialized work force
- Focus on core business

11. Which of the following factors create problems in your use of 3PL services? (Please rank the following factors and assign 1 to the most important factor and 7 to the least important factor)

- Lack of control over business operation
- Improper documentation
- Fraudulence activities
- Leakage of competitive information
- Lack of understanding the company's requirements
- Operational failures
- Conflicts among organization's workforce and 3PL providers' workforce.

12. Please indicate the percentage of your company's expenditure on third-party logistics services.

- 0 - 20%
- 21 - 40%
- 41 - 60%
- 61 - 80%
- 81 - 100%

13. Please indicate the level of commitment that your company have towards the use of 3PL services.

- Very limited
- Limited
- Moderate
- Extensive

14. Your company use 3PL services for-

- International operations
- Domestic operations
- Both international and domestic operations

15. Please indicate your level of satisfaction regarding the overall services of 3PL providers.

- Very satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very dissatisfied

16. Please indicate the impact of using 3PL services in the following areas-

	Areas of impact	Very negative	Negative	Neutral	Positive	Very positive
16.1	Logistic costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.2	Logistic system performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.3	Customer satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.4	Employee morale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

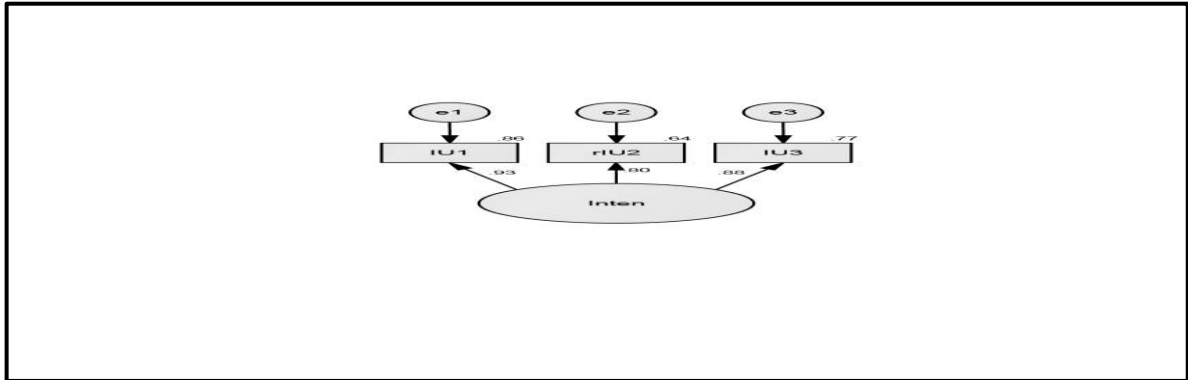
Appendix 3: Univariate and multivariate normality

Variable	min	max	skew	kurtosis	Critical value
AT7	1.000	7.000	-.971	1.102	3.506
rAT6	1.000	7.000	-1.018	.964	3.068
rAT5	1.000	7.000	-.802	.232	.740
rAT4	1.000	7.000	-.639	.023	.073
rAT3	2.000	7.000	-1.024	.334	1.063
AT2	1.000	7.000	-1.269	.846	2.691
rAT1	1.000	7.000	-1.406	1.996	6.352
PBC6	1.000	7.000	-.679	-.016	-.050
PBC5	1.000	7.000	-.730	.086	.274
rPBC4	1.000	7.000	-.193	-1.142	-3.634
PBC3	1.000	7.000	-.165	-.939	-2.988
PBC2	1.000	7.000	-.572	-.075	-.238
PBC1	1.000	7.000	-.547	-.069	-.219
SN4	1.000	7.000	-.165	-1.000	-3.182
SN3	1.000	7.000	-.858	.503	1.602
SN2	1.000	7.000	-1.005	.986	3.139
SN1	2.000	7.000	-.446	-.545	-1.735
IU3	1.000	7.000	-1.025	.353	1.123
rIU2	1.000	7.000	-1.315	1.069	3.400
IU1	1.000	7.000	-1.073	.339	1.080
Multivariate				224.100	58.881

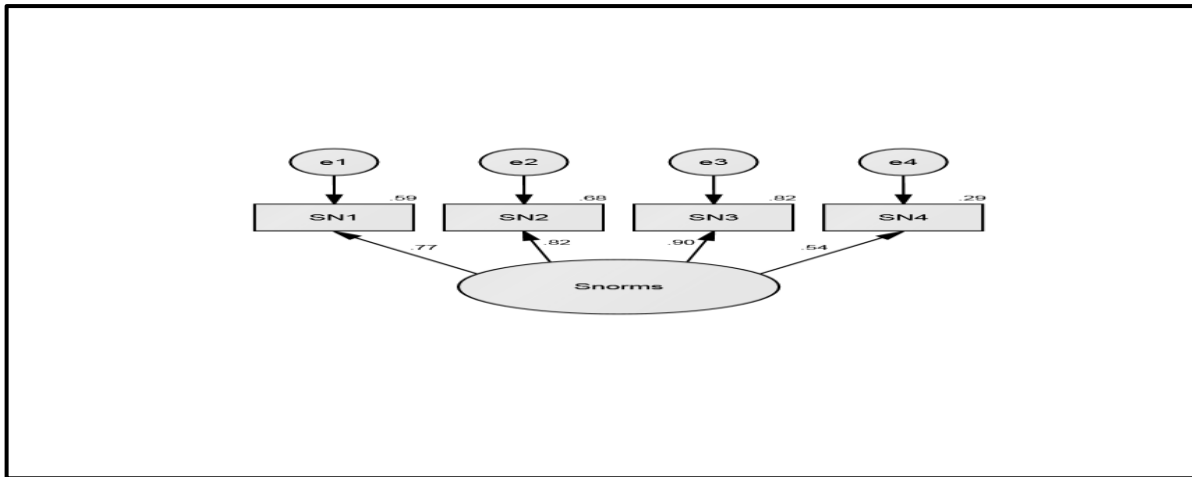
Appendix 4: Multicollinearity

Intention as dependent variable		Attitude as dependent variable		Subjective norms as dependent variable		Perceived behavioural control as dependent variable	
	VIF		VIF		VIF		VIF
Attitude	4.409	Intention	3.964	Intention	2.874	Intention	4.073
Subjective norms	5.630	Subjective norms	6.745	Attitude	3.830	Attitude	4.318
Perceived behavioural control	3.647	Perceived behavioural control	3.476	Perceived behavioural control	2.850	Subjective norms	6.234

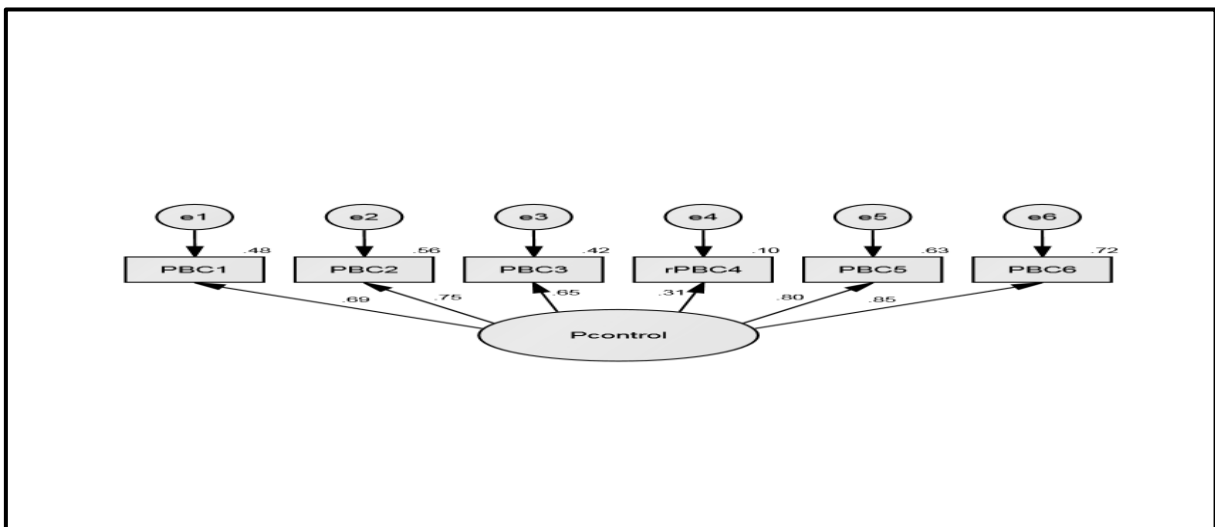
Appendix 5: One- factor congeneric models (Intention, Subjective norms and Perceived behavioural control)



One factor congeneric model (Intention)



One factor congeneric model (Subjective Norms)



One factor congeneric model (Perceived behavioural control)

Appendix 6: Summary of model parameters

	Weights	Covariances	Variances	Means	Intercepts	Total
Fixed	24	0	0	0	0	24
Labeled	0	0	0	0	0	0
Unlabeled	16	6	24	0	0	46
Total	40	6	24	0	0	70

Appendix 7: AMOS output for measurement model: parameter estimates

A. Regression

Regression weights between items and constructs			Estimate	Std. error	Critical value	P value
rIU2	<---	Intention	.817	.049	16.657	***
IU3	<---	Intention	.962	.047	20.321	***
SN2	<---	Subjective norms	1.213	.089	13.638	***
SN3	<---	Subjective norms	1.229	.086	14.312	***
SN4	<---	Subjective norms	.909	.112	8.105	***
PBC2	<---	Perceived behavioural control	1.008	.093	10.837	***
PBC3	<---	Perceived behavioural control	1.008	.111	9.088	***
rPBC4	<---	Perceived behavioural control	.547	.121	4.509	***
PBC5	<---	Perceived behavioural control	1.053	.089	11.846	***
PBC6	<---	Perceived behavioural control	1.173	.095	12.361	***
AT2	<---	Attitude	1.025	.114	8.978	***
rAT3	<---	Attitude	1.058	.084	12.648	***
rAT4	<---	Attitude	1.081	.100	10.796	***
rAT5	<---	Attitude	1.112	.095	11.679	***
rAT6	<---	Attitude	.981	.084	11.661	***
AT7	<---	Attitude	1.028	.086	12.001	***

***p < .01

B. Covariance

Regression weights between constructs			Estimate	Std. error	Critical value	P value
Intention	<-->	Subjective norms	1.119	.140	7.989	***
Intention	<-->	Perceived behavioural control	.920	.135	6.818	***
Intention	<-->	Attitude	.945	.126	7.514	***
Subjective norms	<-->	Perceived behavioural control	.815	.115	7.082	***
Subjective norms	<-->	Attitude	.717	.100	7.143	***
Perceived behavioural control	<-->	Attitude	.647	.099	6.511	***

***p < .01

C. Variance

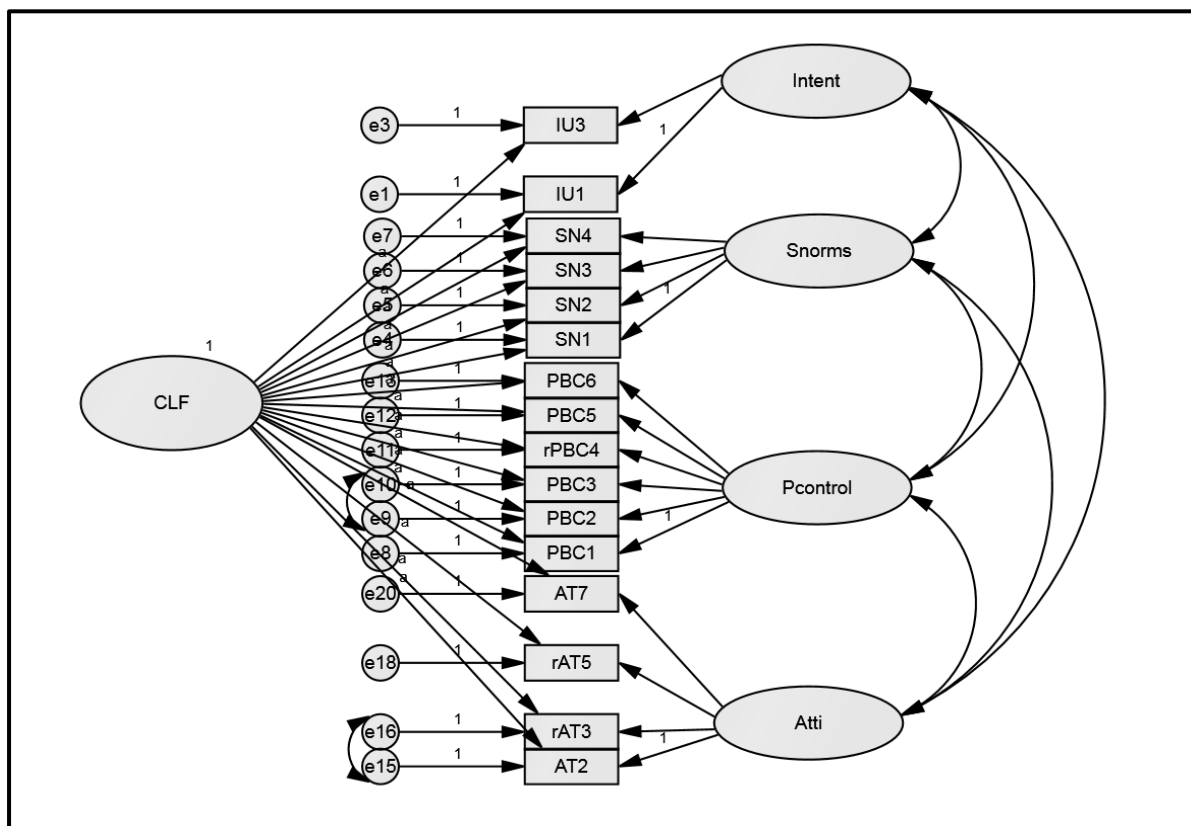
Unobserved variables	Estimate	Std. error	Critical value	P value
Intention	1.938	.214	9.055	***
Subjective norms	1.020	.152	6.697	***
Perceived behaviour control	1.104	.178	6.190	***
Attitude	.882	.137	6.458	***
e1	.378	.062	6.086	***
e2	.713	.076	9.322	***
e3	.468	.065	7.224	***
e4	.777	.081	9.647	***
e5	.573	.070	8.223	***
e6	.399	.058	6.904	***
e7	2.172	.205	10.608	***
e8	1.042	.108	9.633	***
e9	.943	.100	9.460	***
e10	1.823	.178	10.212	***
e11	3.201	.294	10.869	***
e12	.649	.076	8.534	***
e13	.596	.078	7.675	***
e14	.753	.077	9.769	***
e15	1.715	.164	10.435	***
e16	.475	.054	8.807	***
e17	1.034	.104	9.954	***
e18	.790	.083	9.548	***
e19	.619	.065	9.558	***
e20	.594	.064	9.348	***

***p<.01

Appendix 8: Total variance explained

Components	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.577	31.155	31.155	15.577	31.155	31.155
2	5.157	10.313	41.468			
3	3.823	7.645	49.113			
4	2.289	4.579	53.692			
5	1.905	3.809	57.501			
6	1.600	3.200	60.701			
7	1.475	2.951	63.652			
8...to 45...			
46	.115	.230	99.273			
47	.108	.216	99.489			
48	.103	.207	99.696			
49	.087	.174	99.869			
50	.065	.131	100.000			

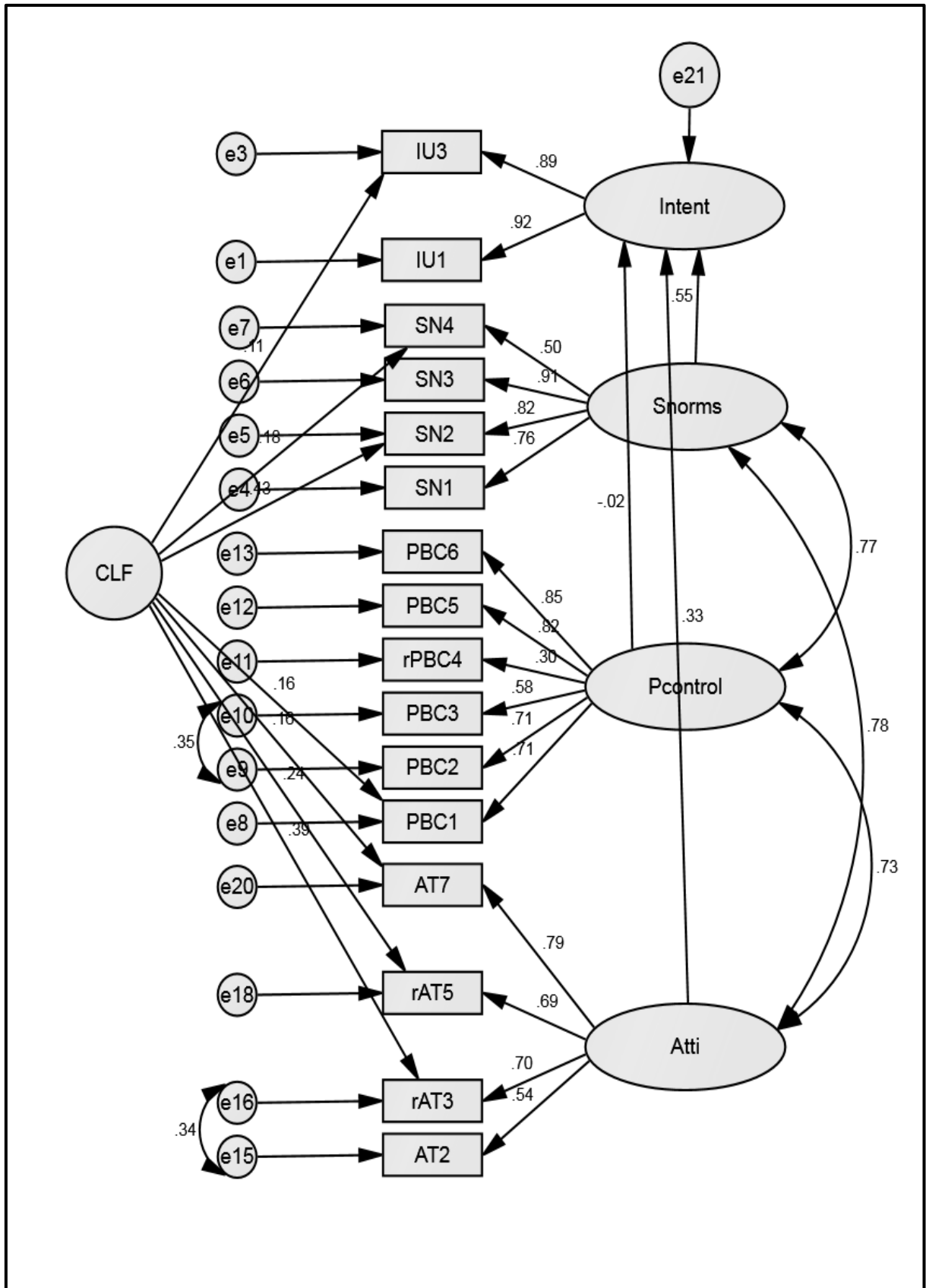
Appendix 9: CFA Measurement model (using a common latent factor- CLF)



Appendix 10: Difference of regression weights of CFA with and without CLF

Regressions between items and constructs		Differences of regression weights
IU1	<--- Intention	0.012
IU3	<--- Intention	0.104
SN1	<--- Subjective norms	0.013
SN2	<--- Subjective norms	0.321
SN3	<--- Subjective norms	0.073
SN4	<--- Subjective norms	0.125
PBC1	<--- Perceived behaviour control	0.127
PBC2	<--- Perceived behaviour control	0.037
PBC3	<--- Perceived behaviour control	-0.039
rPBC4	<--- Perceived behaviour control	-0.015
PBC5	<--- Perceived behaviour control	0.087
PBC6	<--- Perceived behaviour control	0.077
AT2	<--- Attitude	0.08
rAT3	<--- Attitude	0.222
rAT5	<--- Attitude	0.159
AT7	<--- Attitude	0.123

Appendix 11: CFA structural model (using a common latent factor- CLF)



Appendix 12: A Comparison of country specific 3PL studies

Dimensions of comparison	USA 1992	Australia 2011	Singapore 1999	India 2006	Saudi Arabia 2005	Europe 1998	Bangladesh 2013
<i>Extent of 3PL use</i>							
Length of experience	>5Yrs (59%)	>5Yrs (61%)	>3Yrs (84%)	>3Yrs (28.6%)	1 to 3Yrs (35%)	>5Yrs (60%)	>5Yrs (32.6%)
Most outsourced service	Warehouse management (45%)	Warehouse management (64%)	Shipment consolidation (55.3%)	Outbound transportation (55.7%)	Carrier selection (32.7%)	Shipment consolidation (60%)	Freight forwarding (42.6%)
level of commitment to 3PL use	Limited (49%)	Extensive (48%)	Moderate-extensive (76.3%)	Moderate-extensive (67.6%)	Moderate-extensive (-)	-	Moderate (42.6%)
3PL expenditure of total logistics budget	0-10% (59%)	> 40% (44%)	≤30% (50%)	≤20% (63.4%)	≤20 % (45%)	≤20 % (27%)	≤20% (46.3%)
<i>3PL Decision Making Process</i>							
Source of 3PL decision	Corporate (49%)	Corporate (65%)	Local (39.5%)	-	Corporate (50%)	Operational (45%)	Corporate (63.3%)
Information source about 3PL services	Third party representatives (52%)	-	Direct sales call (40%)	-	Direct sales Call (40%)	Discussion with logistic professionals (58%)	Discussion with logistic professionals (47.9%)
Involvement of other functional managers in 3PL decision	Finance (63%)	-	Marketing (70.8%)	-	Finance (28%)	Finance (64%)	Marketing (52.9%)
<i>Impact of 3Pl usage</i>							
Logistic costs	Positive (58%)	Positive (59%)	Positive (73.7%)	-	Positive (54.9%)	Positive (70%)	Positive (30.8%)
Logistic system performance	Positive (86%)	Positive (71%)	Positive (78.9%)	Positive (54.3%)	Positive (53%)	No impact (46%)	Positive (28.8%)
End customer satisfaction	Positive (72%)	-	Positive (71.1%)	Positive (45.2%)	Positive (53%)	Positive (54%)	Neutral (21.7%)
Employee morale	Positive (73%)	Negative (45%)	Positive (73.3%)	Average (46.6%)	Positive (54.9%)	No Impact (45%)	Neutral (36.7%)
Most cited benefit	Decreased logistic costs (54%)	Cost reduction (78%)	Cost reduction (-)	Cost reduction (80.6%)	-	Lower costs (56%)	Low cost (26.4%)
Most cited difficulty	-	-	Enforce IT (70%)	-	Lack of understanding (21%)	Employee approval (18%)	Lack of control (16.1%)
Overall satisfaction of 3PL use	Satisfied (57%)	Satisfied (64%)	Satisfied (85.5%)	Majority satisfied	Positive (79%)	Majority satisfied	Satisfied (58.7%)