

**EVALUATING THE ELECTRONIC DATA INTERCHANGE  
ADOPTION DECISION AMONG MALAYSIAN  
MANUFACTURING COMPANIES**

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## ABSTRACT

Electronic Data Interchange has been in use from the early 1960s and has evolved over the last 50 years to include Internet EDI. Even though EDI has a long history, it is still very much in use today by major US and European automotive industry and the energy, healthcare, retail and manufacturing sectors. This is in spite of competing options from electronic procurement to enterprise resource systems. The main reason for its longevity is because it's standards-based and its reliability has been proven through many years of commercial use. EDI has many benefits to offer its adopters. Notwithstanding this, businesses which adopt EDI has other imperatives to base their decisions. EDI has diffused from its early days in the United States, Europe and Japan to other parts of the world including South East Asia. Businesses which have to succeed in today's competitive world have to resort to technology to improve their supply chain management. One of the dominant technologies which these businesses have to consider today is electronic data interchange.

Electronic Data Interchange (EDI) has been used mainly in the shipping and logistics industry in Malaysia through the mandatory government initiated SMK-Dagang\*Net for over a decade. In the non-mandatory category, EDI has been adopted by banks in Malaysia, the bigger Malaysian-based retailers as well as manufacturers in Malaysia. Until today EDI is still not widely diffused to other businesses in Malaysia.

This study is exploratory in nature and has two major objectives. The first objective is to determine the function, diversity and breadth of EDI usage in Malaysian manufacturing companies. The second objective is to identify the significant factors that influence EDI adoption decisions. The motivation for the first objective is that there is a lack of current information on EDI use in manufacturing companies. The motivation for the second objective is to provide insight into why companies adopt or do not adopt electronic data interchange.

The sampling frame was from the Federation of Malaysian Manufacturer's (FMM) Directory. The usable sample of 284 companies consists of 86 (30.20%) EDI adopters and

198 (69.80%) EDI non-adopters. Manufacturers in Malaysia use EDI mainly for sales and purchase order transactions. This study found that the Internet is by far the most popular communications channel followed by private (VANs) and proprietary networks.

The theoretical bases of diffusion of innovation (DOI) theory, social exchange theory (SET), trust theory and critical mass theory (CMT) have been synthesized into the Tornatzky and Fleischer's (1990) technology-organization-environment research framework which was used for this study.

Fourteen research hypotheses were formulated and tested. Hypothesis testing showed that costs, size, external pressure and interorganizational trust were significant EDI facilitators, while e-commerce legal framework was a significant EDI inhibitor. The finding that interorganizational trust is significant is a revelation and points to a newer trend of the importance of developing trusting business relationships to mitigate uncertainties in the exchange relationship.

t-tests showed that EDI adopters and EDI non-adopters differ significantly in size, top management support, information technology capability, internal championship, external pressure and interorganizational trust variables. The three variables of top management support, external pressure and interorganizational trust were the best differentiators for adoption. Means analysis showed that costs was perceived to be the most important variable while external pressure was perceived to be the least important variable.

This study makes practical contribution by providing valuable insights to the company management when considering EDI adoption, to EDI solution vendors when considering how to sell their software and services and to government when formulating technology policies. The theoretical contribution of this study is through extending research work in the area of interorganizational information systems (IOS) by providing better understanding of the research area. This study also updates the information to the body of EDI knowledge of Malaysian manufacturers. Finally, the study has shown the appropriateness of the use of

Diffusion of Innovation theory variables and Social Exchange Theory variables in the Tornatzky-Fleischer's (1990) Technology-Organizational-Environmental framework.

## ABSTRAK

Salingtukaran data elektronik (EDI) telah digunakan bermula dari 1960 dan telah bertambah maju melalui 50 tahun sehingga meliputi Internet EDI. Walaupun EDI mempunyai sejarah panjang, ia masih banyak digunakan oleh industri besar automotif US and Eropah dan oleh sektor tenaga, penjagaan kesihatan, runcit dan perkilangan. EDI masih digunakan walaupun terdapat pilihan dari e-perolehan dan sistem sumber perusahaan (ERP). Sebab utama ia masih digunakan sehingga hari ini ialah kerana ia berasaskan piawaian dan kebolehpercayaan telah dibukti melalui banyak tahun digunakan oleh perniagaan. EDI memberi banyak manfaat kepada pengguna-penggunanya. Walaupun demikian, perniagaan yang menggunakan EDI mempunyai lain-lain sebab penting untuk membuat keputusan menggunakan REDI. EDI telah bersebar dari mula-mula di Amerika Syarikat , Eropah dan Jepun ke lain-lain tempat di dunia termasuk Asia tenggara. Perniagaan yang perlu berjaya di dunia persaingan hari ini perlu menggunakan teknologi untuk memperbaiki pengurusan rantaian pembekalan. Salah satu teknologi paling berpengaruh yang perlu dipertimbangkan oleh perniagaan ialah salingtukaran data elektronik.

Salingtukaran data elektronik (EDI) telah digunakan terutamanya di industri perkapalan dan logistik di Malaysia melalui inisiatif mandatori kerajaan iaitu SMK-Dagang\*Net selama lebih dari satu dekad. Dalam kategori bukan mandatori, EDI telah digunakan oleh bank-bank di Malaysia, peruncit besar di Malaysia dan pengilang-pengilang di Malaysia. Sehingga hari ini, EDI masih belum tersebar luas ke lain-lain perniagaan di Malaysia.

Kajian ini secara tinjauan dan mempunyai dua objektif utama. Objektif pertama ialah untuk menentukan fungsi, kepelbagaian dan keluasan penggunaan EDI di syarikat perkilangan Malaysia. Objektif kedua ialah untuk mengenalpasti faktor-faktor penting yang mempengaruhi keputusan penerimaan EDI. Motivasi objektif pertama ialah kekurangan maklumat semasa mengenai penggunaan EDI di syarikat perkilangan. Motivasi objektif kedua ialah memberi pandangan mendalam mengapa syarikat-syarikat menerima atau menolak EDI.

Rangka persampelan ialah dari direktori Federation of Malaysian Manufacturer's (FMM). Sampel bolehguna 284 syarikat terdiri daripada 86 (30.20%) pengguna EDI dan 198 (69.80%) bukan pengguna EDI. Penggunaan utama EDI ialah dalam urusan pesanan jualan dan belian. Internet ialah saluran komunikasi paling popular diikuti oleh rangkaian swasta (VANs) dan empunya.

Asas-asas berteori iaitu teori "Diffusion of Innovation (DOI)", teori "Social Exchange", teori "Trust" dan teori "Critical Mass" telah disintesiskan ke dalam rangka "technology-organization-environment" Tornatzky dan Fleischer (1990) yang digunakan dalam kajian ini. Empat belas hipotesis penyelidikan telah dibinakan dan diuji. Ujian hipotesis menunjukkan bahawa kos, saiz, tekanan luaran, kepercayaan antara organisasi ialah fasilitator EDI penting manakala rangka undang-undang e-dagang ialah penghalang EDI penting. Dapatan bahawa kepercayaan antara-organisasi sangat bermakna ialah satu pendedahan dan menunjukkan trend baru menjalin perhubungan perniagaan berasas kepercayaan untuk mengurangkan ketidakpastian di perhubungan pertukaran.

Ujian-t menunjukkan bahawa pengguna EDI dan bukan pengguna EDI berbeza secara penting dalam pembolehubah saiz, sokongan pengurusan atasan, kemampuan teknologi maklumat, sokongan kuat dalaman, tekanan luar dan kepercayaan antara organisasi. Pembolehubah sokongan pengurusan atasan, tekanan luaran, kepercayaan antara-organisasi adalah pembeza terbaik untuk penerimaan EDI. Analisis purata menunjukkan bahawa kos dianggap pembolehubah terpenting manakala tekanan luar dianggap pembolehubah yang paling tidak penting.

Kajian ini memberi sumbangan praktik dengan memberi pandangan mendalam kepada pengurusan syarikat apabila mempertimbangkan penerimaan EDI, memberi pandangan bagaimana menjual perisian dan perkhidmatan untuk pembekal EDI dan pandangan bagaimana merumuskan polisi. Sumbangan teori dari kajian ini ialah menerusi melanjutkan kerja-kerja kajian dalam bidang sistem-sistem informasi antara organisasi untuk memberi

fahaman lebih baik dalam bidang kajian ini. Kajian ini juga memberi maklumat kini kepada badan pengetahuan EDI di kalangan pengilang Malaysia. Akhirnya, kajian ini telah menunjukkan kesesuaian penggunaan pembolehubah teori “Diffusion of Innovation” dan teori “Social Exchange” dalam rangka Tornatzky-Fleischer (1990) “Technology-Organization-Environment.”



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