



Jurisdiction in B2C E-Commerce Redress

Ong Chin Eang

Monash University Malaysia, No 2, Jalan Kolej, Bandar Sunway, Petaling Jaya, 46150, Selangor, Malaysia,
Phone Number: (603) 56360600 (EXT: 322), Fax Number: (603) 5638 3055, E-mail: ong.chin.eang@infotech.monash.edu.my

ABSTRACT

E-commerce jurisdiction has always been an issue because e-commerce exists in a borderless environment and this e-environment diminishes the importance of physical location and locality. This imposes a great concern over which country's jurisdiction to engage when disputes occur between business and consumer in the e-environment. This is crucial when the consumer is seeking 'redress' as there is always the question as to where a court action should be brought in? The current jurisdictions by the European Commission (EC) within the European Union (EU), The E-commerce Directive – Country of Origin and Rome II are still in the drafting process. These legislations are not the total solution. This paper discusses the issue of current jurisdiction, whether there is a need to call for a single jurisdiction and what complications arise when seeking redress in this borderless e-environment. This paper also raises important issues that relate to the gaps and loopholes that exist in Country of Origin and Rome II.

1.0 JURISDICTION

Authorities, businesses and even consumers know that the liability in global e-commerce is virtually limitless. Hence, there is a need for clear and effective protection (redress) to consumers. This is one of the means for creating consumer confidence in the e-environment. The test to determine and limit liability in the global e-market is jurisdiction. However, the question is:

"What test or rules are applied by the courts to determine proper jurisdiction for Internet based transactions in cases where defendants reside or provide goods or services from outside the jurisdiction?" (Oosterbaan, Jeekel & Jonker, 2003)

One of the reasons jurisdiction has always been an issue is because e-commerce is borderless. E-commerce is formulating an e-environment or a domain that has no concept of locality in a geographical sense. This e-environment does not simply diminish the importance of physical location, it demolishes locality. In addition to that, e-commerce was contemplated to go beyond the physical boundary, to provide and create the ease of use and facilitates businesses and consumers to land at unreachable destinations. Thus, it has rendered territorial jurisdiction problematic (Kobrin, 2001).

The principle issues of jurisdiction are which country's laws to engaged when disputes occur between business and consumer in more than one country, and the question over which court is able to judge the dispute. At first, this might appear only to be of importance to legal advocates, but there is an actual increase of cross-border e-commerce between consumers in one country buying goods or services from businesses based in other countries. Without certainty over the legal disputes and risks in this business to the consumer e-market, cross border e-commerce cannot reach its potential. Hence, the issue of jurisdiction in redress is crucial not just to businesses that trade online, but to consumers who buy online. (Cable & Wireless, 2003)

2.0 CALL FOR A SINGLE JURISDICTION?

Distance poses a barrier to cross border e-commerce. The leading complication encountered in the e-environment is that cross border channels are not always sympathetic to the needs of consumers. There is no certainty for a consumer to know who the business/merchant is.

The opportunity to inspect the product before the transaction is nearly zero. Hence, consumers assert that there is a lack of respect for their rights in this e-environment because high numbers of consumers have no idea by whom or under what jurisdiction they are protected when seeking redress. Consumers further claim that in this cross border e-commerce environment, "We are entering into a dangerous minefield". From the second a consumer places an online order until the end payment is complete, consumers have already moved in and out of numerous regulatory realms. The transaction could be national or international and consumers do not know when they are leaving a regulated zone and entering unregulated areas (Mitchell and Robertson, 2001).

When a consumer is seeking redress there is always a question as to where a court action should be brought? And the confusion here is how can a consumer enforce ruling when business and consumer are allocated in different countries. For example, Michael Thacker, the spokesman from Intuit Corporation, claims that "Legal Considerations" were one of the sound reasons Mountain View, a Californian financial software maker, eased up on its online service on foreign lands. Michael Thacker further added, "Due to the uncertain jurisdiction climate that surrounds e-commerce, it is the company's decision to refocus its strategy." (Newman, 2003)

The fear amongst business and consumer requires international agreement to clarify this issue. If consumers are seeking redress outside the borders of their country the court must be in the position to enforce a binding decision. This authority must hold jurisdiction over both parties, namely business and consumer (Podlas, 2000). There is no single code or internationally recognized jurisdiction. At present the guidelines such as E-commerce Directives and Rome II that have been adopted are still very uncertain. Thus, jurisdiction is a fundamental problem and it places a significant burden on business and consumer.

3.0 COMPLICATION OF JURISDICTION

3.1 Whose Jurisdiction?

A classical illustration of complicated jurisdiction when seeking redress is the question of:

"Has the business created a virtual storefront in the consumer's jurisdiction to make a sale, or has the consumer virtually traveled to the business's jurisdiction to make a purchase? Therefore, it is possible for a consumer to order a book from her home in Malaysia from a seller physically located in Melbourne, it is as if the bookseller boarded a plane and delivered the book to the purchaser (consumer) in Malaysia, or as if the purchaser (consumer) flew to Melbourne to buy the book off the shelf?" (International Chamber of Commerce, 2001)

This issue results in businesses confining their markets and reducing their products on offer until redress resolution is more certain and predictable. Eventually, consumers may be embittered with limited choices, face a more competitive price, or be deterred from shopping online due to the basis of their residence.

In reality a complicated jurisdiction could extend to bringing the edge of e-commerce redress into chaos. As an illustration, a merchant/business located in Singapore engaged in a transaction with a business established in Australia through the connection of a server located in New Zealand, which is supported by the Internet Service Provider

headquarters in Hong Kong. He/she executes a transaction with a consumer in Thailand and the products purchased will be delivered directly to a friend living in Japan. If a dispute arises and there is a need to seek redress then the question is; in which jurisdiction? This attests that the legal and regulatory complications of the jurisdiction could be far greater than those encountered between just two countries (Ham and Atkinson, 2001).

With all the different jurisdictions implicated, inconclusiveness occurs as to the legislation and mechanisms (redress) that will care for the interests of both businesses and consumers. Once more, in order to avoid these uncertainties, businesses and consumers are presumably going to operate only in the domestic e-commerce market.

E-commerce is not moving parallel with technology or the demand for legislation. By way of illustration, Vietnam is the case. While other countries such as the EU already enforce the E-Commerce Directive (Country of Origin) among its 15 member states and are fighting to repudiate the ROME II (Country of Destination), Vietnam is to issue its 'first' e-commerce regulations. Regulations governing e-commerce do not exist in this country, except a very straightforward stipulation that is only available for electronic mail, commercial transactions and e-payment transactions. Not to mention that such stipulations are still in the middle of the drafting process, thus inadequate to regulate e-commerce transactions (UNDP, 2003 and The Vietnam Investment Review, 2003).

How many countries in Asia, Europe and the U.S experience a similar issue to that which occurred in Vietnam? On that account, it is undoubted that jurisdiction remains a complicated issue in e-commerce redress

3.2 Where it happened

Before the question of whose jurisdiction to apply is answered, there is another question about 'Where online activity takes place?' or 'Where did it occur?' It has always been complicated to know in which country the transaction occurred. There is the idea that the e-commerce business and consumer now reside in a borderless world. There are doubts about location or establishment of any redress mechanisms, and yet only a few regions have corresponding laws. Moreover, the questions about authority and effectiveness of enforcement will stop when it reaches the border (Caslon Analytics, 2001). As such, how can one find an answer?

Although the e-environment, same as with brick and mortar, has different means by which to ascertain where the transaction was located, the simplest solution is to ask the business or consumer. Nevertheless, it is never easy to define who chose to initiate the transaction when the situation occurs in the borderless e-environment.

In cases when authorities came upon this situation, they usually defined the case by the degree to which the business's website was 'active' or 'passive'. On account of that, business claims that in the e-commerce environment their relationship with the consumer is not considered an active conjunction. Business argues they do not appeal to or try to captivate the consumer by creating an activity in the consumer's country of residence nor with the intention to push the advertising directly into the country. E-commerce is accessible globally with no boundaries and does not count on any physical affinity or attachment between business and consumer, thus business claims that they rely on the consumer to take the 'initiative' and decide whether or not to execute the e-transaction with them (business) (Barlow, 2003)

As such, it is certain that consumers become eligible for redress only if they are the 'passive' factor in the relationship, that is, consumers should not be the ones to initiate the contact with the businesses. Besides that, businesses assert that any consumer who commits to an e-transaction cannot be regarded as 'passive' because consumers who assert the lead to surf the Internet in search of a specific product or service render themselves active (Rosner, 2002). Other than that, businesses point out that as e-commerce has global characteristics and is accessible to users anywhere and anytime, if the businesses merely post materials on a website then this is just a 'passive' activity and this passive factor is insufficient to justify the exercise of personal jurisdiction (European Publishers Council, 2003 and Bharuka & Fisher, 2001).

3.3 Lack of Enforcement and Uncertainty

Business went on to purport the argument that e-commerce only started from the beginning of 1993 or 1994 and it was predominantly driven by the private sector. Government involvement stimulated the advancement of the technology, but the real development of e-commerce was due to private sector guidance. Therefore government should leave the issue of jurisdiction to the private sector (Maxwell, 1999). Furthermore, it always appears that governments are not in the position to enforce judgment upon foreign cases. Obviously this powerlessness to enforce jurisdiction over foreign redress issues is an additional complication and burden to any government. With the current international jurisdiction, E-commerce Directives in the EU and Rome II (still in the drafting process), it is unlikely to be an effective enforcement alternative for jurisdiction obtained in a consumer's country of residence against business located outside the jurisdictions influence, (United State Council for International Business, 2000). If government were to leave the issue of jurisdiction to business, the controversial argument is, can business enforce it?

In addition to the issue of a lack of enforceability, businesses and consumers further support the argument that jurisdiction failed to buy their confidence and trust because disputes potentially have multiple solutions. With the jurisdiction currently in operation, a single 'input' in a particular e-commerce business transaction, can end in multiple different 'outputs', or legal jurisdictions. This is due to different private international legislation that engages at an international, regional (i.e. EU) and even a national level. By way of illustration, back in 1997, when the European Community and the Japanese Ministry of Industry and Trade delivered policy documents on e-commerce, these parties encountered the same issue – one input, multiple outcomes. In this case, the profoundly broad agreement on e-commerce policy in this document is rather striking given the countries diverse legislation and various cultural traditions (Maxwell, 1999). In addition to that, e-commerce is still developing. Courts do not follow the same thinking when conforming on matters of online dispute and further confuse businesses and consumers with different interpretations by different courts. Consequently, this gives rise to the need to establish certainty on the outcomes of any jurisdiction, and also on the liabilities of businesses and consumers involved (Cable & Wireless, 2003).

4.0 E-COMMERCE DIRECTIVES (COUNTRY OF ORIGIN) AND ROME II JURISDICTION

Although there is no easy solution to the problem of jurisdiction and the choice of law to protect consumers in the electronic marketplace, the legal approach of Country of Origin and Country of Destination have been outlined. EU countries are already using 'Country of Origin - E-Commerce Directive' to govern e-commerce transactions, while the 'Country of Destination', or Rome II – that allows transactions to be governed by the laws of the country of the buyer is still being debated. The question of what laws to use to govern this still arise (Goldstein, 2001):

The issue is why is there such difficulty establishing a common jurisdiction to govern the e-commerce redress and why is there support of the E-Commerce Directive and a dispute against Rome II? All these because businesses are worried foreign laws levy judgment against them and consumers are worried large corporations or businesses could use the treaty to pick on them. And yet, all this is happening now.

4.1 Rome II

When European Commission put forward the draft of Rome II, businesses claim there is no need of Rome II initiative. Businesses further assert that there is no evidence either from industry or consumers to support that there is a need of a uniform jurisdiction (Rome II) on the judgment of the law applicable to non-contractual redress relations. Businesses strongly opposed this Rome II and argue at present no definite occurrences showing that any dispute issues exist, which need to be brought to the attention of Rome II regulation (Collins, 2002).

The European Commission claims that the aim of Rome II is to strike a reasonable balance between the benefits of businesses and

consumers involved in this e-commerce environment. Businesses agree that with Rome II will be able to provide consumers with certainty and greater protection, and this could be one of the possible ways to build up their trust and confidence. Theoretically, Rome II is striking a reasonable balance of the interest of both parties. However, in practice this jurisdiction reflects that any businesses could be subjected to thousands of laws with unforeseeable liability. Understanding and respecting the various laws would place highly restrictive burdens on any businesses, large or small (Out-Law, 2003, Caplan, 2001 and Europa, 2003).

In general, the European Commission is putting businesses at greater risk than before. With Rome II, the question of 'passive' or 'active' will no longer be an issue and how to define 'passive' or 'active' states is not important to both parties. Businesses are always attached to the risks and their liability is unavoidable because this EC proposal leaves businesses with no choice.

Businesses are particularly concerned with the internal market and consistently argue that Rome II is not promoting or having any benefits to the single market principle. The point is; businesses are anxious that Rome II might demolish the internal market (EU). If this happens, businesses (merchants) in these 15 states (EU) will encounter disadvantages. Without doubt, businesses are not concerned about consumers' interests in Rome II. Certainly, businesses/merchants in these 15 states (EU) have no intention to strike a balance between the interest of businesses and consumers.

Even the International Chamber of Commerce (ICC) does not understand the EC view of Rome II and ICC believes this will have a harmful impact among the 15 states of the EU (International Chamber of Commerce, 2000). People (consumers) are staying away from the EU e-markets. Besides that, the EC possibly realizes that this Single Market concept is an advantage to the EU's 15 member states, but in the long term the trade might be unsuccessful to attract or drive the traffic of foreign investors/consumers. Hence, the objective to establish Rome II is to 'balance the legal certainty' or what has been mentioned earlier, to 'strike a reasonable balance'. In point of fact, EC is creating more complications and confusion.

Due to this fact, it is vital to indicate that the issue of applicable jurisdiction has a global dimension. For that reason, when the authority encounters the question whether it should be treated as an international convention with 'universal application' instead of 'community legislation' (Rome II). In regards to 'universal application', it seems that a global application receives more attentions and respects. As a result, an effective/enforceable should be formed as an international convention, instead of community legislation (Rome II). The international community should be seeking out ways to establish the universal application. With the EC imposing a rigid legislation that is contradictory with other countries, it leads to more uncertainty and cost when disputes encounter conflicting rulings (EU Committee, 2002).

4.2 E-Commerce Directive – Country of Origin

In this cross border environment where nations seem to be tripping over each other with their own jurisdictions, the European Commission introduced the 'E-Commerce Directive – Country of Origin' with the principle that any redress or disputes is in general subject to the law of the EU member state in which it is established, rather than the law of any other country. The EC believes that this approach builds 'legal predictability' among cross border e-channels.

Businesses believe that any one who wants to promote cross border e-commerce but does not give any assurances or certainty to consumers will have to understand that consumers may choose not to involve themselves in e-transactions/activities. This is due to the fact that business hasn't set up the global e-market to give consumers 'confidence' to trade online. As a matter of fact, the EC asserts that the Country of Origin ensures the legal framework exists and this is where consumers can be confident of their basic rights in matters of dispute or redress.

However, consumers argue that the achievement of the directive under Country of Origin is not improving or sustaining consumer trust and confidence. In Country of Origin, a situation is conceivable in which

businesses wish to seek redress from consumers. Hence, any consumers that execute an e-transaction within the EU might find themselves subjected to the foreign jurisdiction in any one of the 15 member states. Similarly, consumers may find themselves in a risky situation and at anytime could be the defendants under this directive (Lawson, 2001).

What's more, this directive is central to a single or internal market. It is certain that this principle is to ensure businesses benefit from the free movement of services and freedom of establishment so that their services can be traded everywhere in the EU as long as businesses comply with the law in their home member states. It is more like self-regulation where this jurisdiction is customized for the 15 member states (European Brands Association, 1999). Indirectly, this directive is similar to a 'club'; as long as you have subscribed and are a member then you will have the privilege to enjoy the benefits. Country of Origin is the club and these 15 member states are the members. Thus, these member states have the privilege to govern the e-transactions, disputes or redress based on the jurisdiction of their home country simply because they are a 'member' of the state in conjunction with the principle of this directive. Obviously, the purpose of the E-Commerce Directive –Country of Origin is to secure a favorable legal framework for EU members.

Because of this approach, business takes for granted that as long as they adhere to their home countries regulations and are transparent in all transactions by making available all relevant information and stating their policy comprehensively and unambiguously before the consumer executes a transaction, then they will have the privilege to trade throughout all EU countries (Kirk and Hooles, 2002). Government is unable to impose any additional regulation on these e-tailers from other parts of the EU. If an Australian business has complied with Australian regulations, it should be able to sell to consumers in Finland without having to consider the Finnish regulations. This principle is not looking into consumer benefits. It enables activities to be controlled at the businesses source and thus it is one of the ways to mitigate their own risks and responsibilities. In actual fact, businesses are magnifying their own protection and passing out the indirect message to consumers that "Under Country of Origin, if any mistakes or errors occur, it will not be my fault and you trade at you own risk" (Theresa Villiers, 2002).

5.0 CONCLUSION

Using the Internet people can communicate with each other regardless of where they live by utilizing the global language of business, English. Geographic and political borders should largely be irrelevant in the e-environment, if, with a single jurisdiction, everyone is speaking the same language. Ultimately, the linguistic and cultural differences or absence of face-to-face communication is no longer an issue in contributing to misunderstandings or impeding the redress between businesses and consumers.

Therefore, when the world is focusing on formulating laws and regulations on e-commerce redress the authority should deal with the differences in legal systems and not conceal technical or legal barriers. The authority should confront the actual issues – uncertainty, enforcement, misunderstanding, and mutual interest. By drawing up International Conventions for settling disputes between business and consumers – with both parties afforded protection (businesses and consumers) and being well defined with no room for a difference in interpretation by various courts, the simultaneous development of cross border e-commerce transactions will not be discourage. This is a very long-term solution but there is no reason why it should not start now.

REFERENCES

- Barloe, J. (2003) *The Continuing Evolution of Internet Jurisdiction*. Internet Law Jurisdiction. Available electronically from <http://www.internetlawjournal.com/content/litigation/article01210301.htm> Accessed August 11, 2003.
- Bharuka, D. & Fisher, W. (2001) *Dispute Resolution in Cyberspace*. Berkman Center for Internet & Society. Available electronically from <http://cyber.law.harvard.edu/ilaw/jurisdiction/> Accessed August 14, 2003.

- Caplan, J. (2001) *You've Got Lawsuit*. CEO.Com. Available electronically from <http://www.cfo.com/printarticle/0,5317,1921|A,00.html?f=options> Accessed August 11, 2003
- Caslon Analytic (2001) *Caslon Analytic Cyberspace Governance Guide*. Available electronically from <http://www.caslon.com.au/governanceguide4.htm> Accessed August 24, 2003
- Collins, S. (2002) *Comments of Yahoo! Europe on The Draft Proposal for a Rome II Regulation*. Government and Regulatory Affairs Yahoo, Europe. Available electronically from http://www.aig.org/r2g/yahoo_position.pdf Accessed July 18, 2003.
- European Publishers Council (2003) *Position Paper of The European Publishers Council on The Draft Council Regulation on Jurisdiction and The Enforcement of Judgment in Civil Commercial Matters*. Available from http://www.epceurope.org/statements/Brussels_Regulation_final_position_paper.shtml Accessed August 24, 2003
- Europa (2003) *Non-Contractual Obligations in Cross-Border Cases*. Available electronically from http://www.europa.eu.int/comm/justice_home/news/intro/news_220703_1_en.htm accessed August 28, 2003
- EU Committee (2002) *Position Paper on The Draft Rome II Regulation*. Available electronically from <http://www.eucommittee.be/Pops/2002archive/rome102002.pdf> Accessed July 25, 2003
- European Brands Association (1999) *Effective Not Theoretical Consumer Protection in Electronic Commerce*. Available electronically from http://www.aim.be/docs/Marketing/AIM_POSc-o-origin.doc_1.doc Accessed July 17, 2003
- Goldstein, N. (2001) 'Brussels I: A race to the top'. *Chicago Journal of International Law*, 2(2), 521-524.
- Ham, S. & Atkinson, R.D. (2001) *A Third Way Framework for Global E-commerce*. Progressive Policy Institute Technology & New Economy Project. Available electronically from http://www.ndol.org/documents/global_ecommerce.pdf Accessed July 15, 2003.
- Healy, T.R. & Duke, K.E. (2002) 'Winners and losers under China's e-sign law'. *The China Review*, 29(6), 32-36.
- International Chamber of Commerce. (2000) *ICC request for re-evaluation of the European Commission's draft proposal for a Council Regulation on the law applicable to non-contractual obligations ('Rome II')* Available electronically from <http://www.iccwbo.org/law/jurisdiction/rome2/documents/00004/> Accessed July 13, 2003
- Kirk, S. & Hooles, A. J. (2002) *e-Commerce Directive*. Available electronically from <http://aporter.pair.com/articles/ecommerce.pdf> Accessed September 5, 2003
- Kobrin, S.J. (2001) 'Territoriality and the governance of cyberspace'. *Journal of International Business Studies*, 32(4), 1-25.
- Cable & Wireless (2003) *Jurisdiction*. Available electronically from http://www.cw.com/about_us/company_profile/public_policy/pp_positions/gp_jur.html Accessed August 8, 2003
- Lawson, P. (2001) *Comments on The Draft Hague Convention on Jurisdiction and Foreign Judgment in Civil and Commercial Matter*. The Public Interest Advocacy Center. Available electronically from <http://www.piac.ca/HagueConvention.htm> Accessed August 24, 2003
- Maxwell, E. E. (1999) *19 Policies for The Emerging E-Commerce Marketplace*. Available electronically from <http://www.aaas.org/spp/yearbook/2000/ch19.pdf> Accessed July 26, 2003
- Mitchell, J. and Robertson, A. (2001) *The FSA's Approach to Regulation of E-Commerce*. Scottish Advisory Committee on Telecommunications. Available electronically from http://www.fsa.gov.uk/pubs/discussion/06/responses/sa_cot.pdf Accessed 25 July, 2003
- Newman, M. (2003) 'E-commerce (A Special Report): The rules – So many countries, so many laws: The Internet may not have borders; But the legal systems certainly does'. *Wall Street Journal*, New York.
- Out-Law (2003) *Supreme Court Mulls Where to Sue for Internet Defamation*. Available electronically from http://www.outlaw.com/php/page.php?page_id=supremecourtnulls1051121181&area=news
- Oosterbaan, D.T.L., Jeekel, C.A. and Jonker, L. (2003) *E-Commerce 2003; Netherlands*. Oosterbaan & Van Eeghen. Available electronically from <http://www.itlawyers.nl/publ/ecom2003.pdf> Accessed July 29 2003
- Podlas, K. (2000) 'Global commerce or global liability? How e-commerce can lead to suit in foreign courts or under foreign law'. *The Mid – Atlantic Journal of Business*, 36(2/3), 89-97.
- Rosner, N. (2002) *International Jurisdiction in European Union E-Commerce Contracts*. Law Library Resources Xchange. Available electronically from http://www.llrx.com/features/eu_ecom.htm Accessed August 8, 2003
- The Vietnam Investment Review (2003) *New Electronic Commerce Regulations in The Pipeline*. Available electronically from <http://search.epnet.com/direct.asp?an=2W83247546761&db=buh> Accessed July 8, 2003
- Theresa Villers MEP (2002) *E-Commerce: A revolution or a legal nightmare?* Available electronically from http://www.theresavilliers.com/link_13.htm Accessed September 16, 2003.
- United Nation Development Programme (UNDP) (2003) 'Vietnam to Issue First E-Commerce Regulation'. Available Electronically from <http://www.undp.org.vn/mlist/ksdvn/012003/post15.htm> Accessed July 25, 2003
- United State Council for International Business. (2000) *Alternative Dispute Resolution for Consumer Transaction in The Borderless Online Marketplace*. Available electronically from <http://www.uscib.org/policy/adrusgfl.htm> Accessed July 29, 2003

0 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/proceeding-paper/jurisdiction-b2c-commerce-redress/32470

Related Content

The Infusion of Technology Within the Classroom Facilitates Students' Autonomy in Their Learning

Fariel Mohanand Garry Soomarah (2018). *Encyclopedia of Information Science and Technology, Fourth Edition* (pp. 2532-2544).

www.irma-international.org/chapter/the-infusion-of-technology-within-the-classroom-facilitates-students-autonomy-in-their-learning/183965

Hybrid Clustering using Elitist Teaching Learning-Based Optimization: An Improved Hybrid Approach of TLBO

D.P. Kanungo, Janmenjoy Nayak, Bighnaraj Naikand H.S. Behera (2016). *International Journal of Rough Sets and Data Analysis* (pp. 1-19).

www.irma-international.org/article/hybrid-clustering-using-elitist-teaching-learning-based-optimization/144703

Estimation and Convergence Analysis of Traffic Structure Efficiency Based on an Undesirable Epsilon-Based Measure Model

Xudong Cao, Chenchen Chen, Lejia Zhangand Li Pan (2024). *International Journal of Information Technologies and Systems Approach* (pp. 1-25).

www.irma-international.org/article/estimation-and-convergence-analysis-of-traffic-structure-efficiency-based-on-an-undesirable-epsilon-based-measure-model/332798

Productivity Measurement in Software Engineering: A Study of the Inputs and the Outputs

Adrián Hernández-López, Ricardo Colomo-Palacios, Pedro Soto-Acostaand Cristina Casado Lumberas (2015). *International Journal of Information Technologies and Systems Approach* (pp. 46-68).

www.irma-international.org/article/productivity-measurement-in-software-engineering/125628

Business Sustainability Indices

Arunasalam Sambhanthan (2018). *Encyclopedia of Information Science and Technology, Fourth Edition* (pp. 609-619).

www.irma-international.org/chapter/business-sustainability-indices/183775