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**A CARIBBEAN STOCK EXCHANGE  
AND THE INTERNET**

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# A CARIBBEAN STOCK EXCHANGE AND THE INTERNET

## INTRODUCTION

The principal thrust of this paper is to propose a Caribbean Regional Stock Exchange, (CRSX). The underpinnings of the idea of CRSX is not to do business, as usual, from a local market point of view. Rather, the main feature is for a CRSX to begin to conduct business via the Internet. The institutionalization of the technology of the Internet, the information superhighway, the cyberspace, if you will, has the possibility that the Caribbean region will not be left in space trying to catch up with the rest of the world of equity markets. This means, also, that the economic spillover effects and positive externalities deriving from the regionalization of the stock exchanges, using cyberspace, will redound to the region and, *ceteris paribus*, will permit the region to benefit from technological advance.

Central to this idea of a Caribbean Regional Stock Exchange, CRSX, to be operationalized via the Internet, is the contextual advance of technological development around the world, the resurrected debate; the on-going discussion about the stock exchanges in the region; one of the four pronged-goals and objectives of the Association of Caribbean States, the level of Internet diffusion in the Caribbean, and, finally, the need for the regional Central Banks and stock exchanges to access and utilize the cyberspace, given the current advance in this technology.

Classical economists argued that growth rates differed across countries because of the different relationships among income distribution, capital accumulation and endemic economic growth. Technology was not factored in their equation. It took Solow (1956) to detail the neoclassical growth theory to make technology an argument in the growth process. Solow, for his part, structured technology as a public good, in a public finance framework. Subsequent empirical research did not support Solow's thesis of technology as having endemic public goods characteristics. Other researchers came forward with a new approach. The new approach centered on the "technology gap" thesis as the modal focus across countries. This *technology gap* was less of a public goods approach and more of an alternative view that positioned technology as complementary with factor accumulation.

Subsequent to Solow, the technology discussion moved to vintage models as developed by Kenneth Arrow (1962) and Nicholas Kaldor and James Mirrless (1962). Technological progress was also *learning by doing* where technology was an externality, namely spillover impacting on investment outside of the given space of the investment. Hirofumi Uzawa (1965), Edmund Phelps (1966), Karl Shell (1967), and others, discussed these models in the context of the diffusion of technology.

Finally, the concept of technology was shown in another light by Richard Nelson and Gavin Wright (1992). They accepted the public goods approach to technology, but they also stressed that technology or "embedded know-how" is embodied in how countries do things and do things differently. Innovation, nuances of change, and the capacity for adapting new technology could have growth enhancing impacts on countries. Country-specific factors are important in all of these endeavors. In other words, the extent to which a country is willing to adopt technology is, in the long run, vital to the trajectory that the growth path will assume. This brings us to the kernel of the paper.

One of the four pronged-objectives and priorities of the Association of Caribbean States is:

*To promote an enhanced economic space for trade and investment with opportunities for cooperation and concerted action, in order to increase the benefits which accrue to the peoples of the Caribbean from their and assets...[CARICOMVIEW, 1995:6]*

In light of the above features surrounding technology, stock exchanges, and the Association of Caribbean States' thrust to encourage a wider participation of investment in the Caribbean, our paper seeks to heighten the discussion and properly lay the foundation for research and implementation of a Caribbean Regional Stock Exchange, CRSX. The key view is that the region has to begin to use the available technology of the information superhighway, the Internet, the World Wide Web, and project the regional equity market into a space that will provide a greater degree of leverage for more persons in the wider Caribbean market to participate in the equity and capital market of the Caribbean.

The analysis in the paper assumes that there is some link between technology and economic growth. Furthermore, the assumption is that it will be to the region's advantage to get on the cutting edge of change to ensure that the goals of the ACS can be fulfilled. The regional market will, of necessity, be one in which risk is involved. As we developed our arguments, we will outline some features to minimize some of the inherent risks. We will also draw on developments in the cyberspace where those developments can assist the regional stock exchanges to minimize risk while "scoping" risks within the ambit of returns. In other words, the risk-return profile will not be eliminated. What we will seek to show is that risk that will be noisy, in a distorting scenario, in the new technology sense, could be minimized. Furthermore, risk associated with equity could be balanced in terms of the returns investors hope to obtain from investing.

The paper will address the need for the Caribbean Regional Stock Exchange, CRSX, by first giving some arguments for regionalization of the stock exchanges. Second, we will identify what technology is available internationally for a regional stock exchange system, such as the one we are proposing. Third, we will outline what currently obtains in terms of the Internet systems in the Caribbean and what the region can do to access and use the Internet to the region's advantage. Fourth, we will present some of the barriers in implementing the regional stock exchange in the technological space that is envisioned. Finally, we will argue that banking (and by extension, Central Banking) technology already exists in the region and worldwide that permits banking on the NET. Brokerage Houses are also on the NET. It is only a matter of time before the region will have to get fully on the NET. The regional equity and financial decision-makers should begin to position themselves on the cutting edge of the new technology, if they are to fully benefit from the opportunities for growth and development, and, in the words of the ACS, "*to promote an enhanced space for trade and investment opportunities...*" for the people of the Caribbean region.

## **A CARIBBEAN REGIONAL STOCK EXCHANGE**

The case for a Caribbean Stock Exchange could be made from the point of view of a pragmatic one of economies of scale and scope without the need to include technology. However, we are of the view that given the current drive in technological developments, and given the nature of equity developments around the world, it would be to the region's long-term detriment if the new technology were not utilized to the advantage of the financial institutions in the equity and capital markets.

A regional stock exchange may be an invincible force impacting on an incorrigible attitude towards technology. Nineteen years ago, Norman Girvan (1976) castigated the concept of technology as it was then propounded and dubbed it "White Magic." We are not of the view that the new white magic of the Internet will work all of the wonders that basic management in the equity markets will not work. But, as Girvan agreed then, the technology of "White magic can still be made to work for us - if it can be made cheaper, more accessible, and more appropriate to our own conditions." (Girvan, 1976: 152)

We are of the view that over these nearly two decades, the *white magic* technology characteristic, of which Girvan spoke, has some strong possibilities in the case of a Caribbean Regional Stock Exchange and its interface with the technology of the information superhighway.

Currently there are three active stock exchanges in the Caribbean, narrowly defined as the CARICOM Caribbean. Of the three exchanges, the Jamaica Stock Exchange is the largest in terms of activity, capitalization and sophistication. But, as was demonstrated in Jones-Hendrickson (1994), these markets in the region are patently minuscule in terms of what they could do. With the soon to be Stock Exchange of the Eastern Caribbean, and no doubt subsequent stock exchanges in other parts of the Caribbean, there is a strong case to be made for the stock exchanges deepening and widening the process of the equity markets and incorporating the governments bonds and securities as part of the full-fledged capital market. In this way the regional equity and capital market will not be so limited to single countries, but will give investors scope beyond their own domestic portfolios. If a regional stock exchange is well orchestrated, properly managed, and functions within the parameters in which it should function, then the positive externalities could be of inestimable proportions for those who wish to take the risk of investing in a regional stock market.

Much capital to seed businesses now comes from businesses own resources. Within recent years, particularly in Jamaica and Trinidad and Tobago, the financial institutions, be they Banks, Merchant Banks, Insurance Companies, have been providing investment capital and other venture capital to seed business development. A regional stock exchange has the possibility of not only widening the equity market, but it will, perforce, also increase the level of efficiency in the stock exchanges both at the local level and the regional level. There will be an acceleration of stock exchanges, there may develop greater linkages in economic and financial systems, and this may give Central Banks a pivotal role to play in terms of guiding the economic trajectories of the respective countries, and the resultant trajectory of the region.

A few points are worthy of development. The widening of the stock exchanges should be obvious. Currently the three stock exchanges could benefit from the strength of the government securities that obtain in other Caribbean countries. In addition, in many of the OECS countries, utilities, specifically, telephones, already sell shares to the public in a non-regulated fashion. There is no securities regulatory force, except for corporate goodwill and company policy to regulate the markets for the stocks of their companies. Some indigenous banks, some insurance companies, and many businesses now issue their own corporate paper and stocks. All of these equity and bonds which are proffered, in a seemingly haphazard fashion, could be brought under one regulatory umbrella. This could lead to a widening of the equity markets for the entrepreneurs and for the investors alike. Furthermore, more persons may be tempted to participate in the equity and capital market beyond the current narrow base.

The issue of efficiency in the equity and capital market is a debatable one. We do not intend to end the debate here. Suffice to note, an efficient market is one where a firm's stock price is a function of all available information about the stock, and further, all stocks are capable of earning a rate of return in line with the market risk of the stocks.

When we contend that a regional stock exchange will be more efficient, our implicit proviso is that a stock exchange must of necessity present all of the available information to the public about a stock, so that the public can make an informed judgement prior to buying the given stock. A regional stock exchange such as the one we envisioned, operating on the information superhighway, must have all of its information available to all persons. The failure to do so

would undermine all of the exchanges, domestically, would undermine the regional stock exchange and would undermine the companies which need to make a strong showing to the public, if the public is to buy shares in the respective companies.

On the question of widening and deepening the equity market by going regional, we appeal to the tenets of modern finance theory. Modern finance theory contends that funds should be widely diversified such that the portfolios' composition mirrors the entire stock market. This view is based on the efficiency market thesis. Larry Wall (1995:1) notes that if we interpret the efficiency market thesis in this context to mean that "stocks are correctly priced and that investors cannot systematically find stocks that are either under- or overvalued", then we can conclude that a regional stock exchange gives the investor the risk/return factor to make or lose money in the stock market. Our contention is that a regional stock exchange will lead to greater degrees of balance, depth and breath in terms of portfolio selection than a portfolio based on one country. One country's stocks would be like a country-specific mutual fund versus a diversified fund that balances the vagaries of one stock against another, across several countries.

Finally, if a regional stock exchange is well organized to minimize the noise, among other distorting factors as noted in Jones-Hendrickson (1994), then the case can be made that in a regional stock exchange, stocks will depend, intertemporally, on the economic fundamentals of the country first and the region, second. There will be times, however, when stock markets may lead the way in terms of the fundamentals. Here, some businesses may show greater financial capacity than the host countries. But as Michael Adler (1995:1353) notes, in discussing Jeffrey A. Frankel (1994) "average country returns (may be) related to national macro-economic attributes, like term structures of interest rates, as well as the more traditional sources of predictability, like price to book-value ratios and their volatilities." In this regional stock exchange, innovation will have to be of critical importance. The slow, non-changing attitude to some businesses in the region, built on the notion that "because grandfather did it, it is right," is an attitude that will take a Caribbean Regional Stock Exchange no where fast.

## **CURRENT TECHNOLOGY FOR A CRSX**

Technology currently exists that may be used to pattern a Caribbean Regional Stock Exchange. The idea is to go beyond mere cross-border trading and have trading on all markets, simultaneously. In other words, all stock markets will be linked electronically. The system that provides the model for our proposed CRSX is the United States of America National Association of Securities Automated Quotations, the NASDAQ. The NASDAQ is an over-the-counter traded market of dealers who compete with each other in making bids and offers for stocks. The bid price is the price for which a dealer is willing to buy a stock. The offer is the price. Of critical importance for our purposes, the NASDAQ is a geographically dispersed set of computer terminals and telephones over which dealers and investors do business.

Around the world today there are a number of NASDAQ-type markets that lend credence to the type of regionalization envisioned in a CRSX. In the NASDAQ arrangement, if an investor wishes to buy or sell a stock, the investor would call a dealer who then checks the NASDAQ listing to obtain the best quotation for competing in the particular stock at the lowest cost. The best price is given the lowest-bid price and a commission. "Inter-dealer" commissions are the driving forces in determining what the actual price of the stock will be.

Linked to NASDAQ is a system called SelectNET. This system permits NASDAQ members to purchase from and sell to other members by computers. Market makers are able to accept orders, execute orders and conduct a variety of price and quantity trades on a knowledge basis.



There is no anonymity in this instance. Securities must be more than 1,000 shares.<sup>1</sup>

Another NASDAQ-type system is INSTINET. INSTINET is owned by Reuters Holdings, PLC. Unlike SelectNet, this screen trading system permits subscribers to trade anonymously. It is important that anonymity is kept because NASDAQ dealers make their money on the spread of the bid-price of a stock. In the case of INSTINET, participants are able to deal without the stringency of knowing who the persons are. This system permits institutional investors to be active in the market. INSTINET spreads could be much lower, given the nature of who the dealers are.<sup>2</sup>

There are a variety of other NASDAQ-type systems which offer good possibilities as models for a Caribbean Regional Stock Exchange. We will briefly outline some of the details of some of these systems.

First there is SPAworks. This is a system designed by R. Steven Wunsch (1991) in which trading is done after the traditional hours of trading. At a specific time after the stock exchange is closed, a single computerized auction is done. This system permits traders and investors to be open to trades all day and it helps them to participate in a bid ask scenario that follows the true Walrasian (auctioneer) system.

Outside of the USA there are automated systems and auctioneer type systems. Richard Roll (1988) details some of the systems around the world. Countries like Belgium, Denmark, France, Italy, Spain, Sweden and Switzerland have automated and auctioneer-type systems. Australia, Canada, France, Japan have automated systems that closely resemble NASDAQ-type arrangements. We close this section by considering four well-developed automated systems on the international scene.

The London International Stock Exchange (ISE) is very similar to the NASDAQ. The ISE is reputedly the most active stock exchange in international stock exchange. The ISE has a quote display like the NASDAQ; this system is called the Stock Exchange Automated Quotation System (SEAO). Orders less than 5,000 shares are automatically executed on the exchange system know as the Stock Automated Exchange Facility (SAEF).

The Toronto Stock Exchange uses a Computer Assisted Trading System (CATS). This system functions as an electronic auctioneer for stocks that are not actively traded. This would be something like a situation in the Caribbean like a Barbados market versus a Jamaica market. The best five buy and sell *limit orders* as well as the name of the brokers who made the orders are listed on CATS (Hansell, 1989: 93; Howard, 1991, 15; Abken, 1993:14). A *limit order* is an order that specifies a price. If a customer places an order of Kingston Ice at  $10\frac{1}{2}$ , this means that the broker will pay no more that  $10\frac{1}{2}$ , though he will try to execute it at a more favorable (lower) price, if he can. If the market dips below the limit price, the broker can then buy the stock for you in your best interest.

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<sup>1</sup>See Peter A. Abken for more details. For a detailed discussion of this system, see the U.S. Securities and Exchange Commission (1991:69).

<sup>2</sup>See David Peter A. Abken (1993:12); Saul Hansell (1991:14-15), and NASDAQ (1991) for more details.



The Paris Bourse (stock market) uses a license version of the Toronto CATS. According to Hansell (1989: 93, 98; Ian Domowitz, 1990: 170), this CATS is under consideration in Brussels, Belgium, Madrid, Spain and Sao Paulo, Brazil. Paris's *Cotation Assistee en Continu*, CAC, is an exchange where a single auction is held everyday supplemented by continuous forward trading in listed stocks and forward contracts (Roll, 1988: 29).

Finally, the Tokyo Stock Exchange system is a Toronto-type CATS. Its system is called Computer Assisted Order Routing and Execution (CORES). CORES is a combination of computer technology system, human circuit breakers, floor traders and a group of overseers, called *saitori*. The *saitori* use computers to monitor the trades between floor traders, the computers and to approve prices. There is, therefore, a combination of human elements and technology. This is important to minimize volatility or to suspend trading. (Hansell, 1989: 97; Abken, 1993: 14). In Table One we illustrate some automated systems around the world. The focus here is only on those automated systems that trade in equities. We have not considered futures and options. Abken (1993) develops more details on these systems.

TABLE ONE

SOME NASDAQ-TYPE AUTOMATED STOCK EXCHANGE SYSTEMS

<u>OPERATORS</u>	<u>SYSTEMS</u>
American Stock Exchange	Post Execution Reporting
Australian Association of Stock Exchanges	Stock Exchange Automated Trading (SEAT)
Cincinnati Stock Exchange	National Securities Trading System (NSTS)
London International Stock Exchange	Stock Automated Exchange Facility (SAEF)
National Association of Securities Dealers	Small Order Execution Service (SOES)
New York Stock Exchange	Designated Order Turnaround System (SuperDOT)
Paris Bourse	Cotation Assistee en Continu (CAC)
Philadelphia Stock Exchange	Philadelphia Automated Communications and Execution System (PACE)
Tokyo Stock Exchange and Execution System	Computer Assisted Order Routing System (CORE)
Toronto Stock Exchange	Computer Assisted Trading System (CATS)

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Source: Abken (1993: 17); U. S. Securities and Exchange Commission (1991); Stanley Angrist (1991); U. S. Congress (1990); Jane C. Kang and John C. Lawson (1990); Amy Rosenbaum (1990); Hansell (1989).

## CARIBBEAN INTERNET RESOURCES

Technology is designed to make economies grow fast. It must be noted, though, that:

*Growth not only depends upon how quickly inputs are accumulated, but also on the quality, the technology embodied in them, and how efficiently they are employed* (Hafez Ghanem and Michael Walton, 1995: 3).

Currently there are a variety of Internet list servers, Bulletin Boards, "websites" and Home Pages that institutions and individuals can access in the Caribbean. Michael A. Malec (1995:6) has detailed sites specifically oriented to the Caribbean Studies on the Net. If one wants to join the Caribbean Studies Association discussion group, all that is required is a message to [Majordomo@listser.bc.edu](mailto:Majordomo@listser.bc.edu) or the list manager at [Malec@bcvms.bc.edu](mailto:Malec@bcvms.bc.edu). As of November, 1995, we "hit" the following sites on the Net. The sites span the gamut from the Caribbean to the USA.

The Bahamas[people/history]: <http://www.gtl.net/bahamas>

Bermuda Biological Station  
for Research: <http://www.bbsr.edu>

Bermuda College: <http://www.bercom.bm>

Bermuda Online: <http://www.microstate.com/pub/micros/forbes>

The Caribbean Connection: <http://mrixp2.mrl.uiuc.edu/~stuart/caribbean.html>

Caribbean Home Page at MIT: <http://caribbean-www.lcs.mit.edu/caribbean-www>

Georgia Institute of Technology <http://www.gatech.edu/carib>

Haiti: <http://www.primenet.com/~refreid>

Jamaica: <http://www.esse.psu.edu/~laing/jamaica.html>

Microstate Resources: <http://www.microstate.com/pub/micros>

Trinidad and Tobago: <http://www.ugcs.caltech.edu/~bennett/trinidad.html>

University of the Virgin Islands: <http://www.uvi.edu>

University of the West Indies  
(Mona) <http://www.uwimona.edu.jm/caribbean.html>

In addition to the above World Wide Web servers, there are also some Bulletin Boards and web servers in the Caribbean that provide access to world wide information and which, *ceteris paribus*, could be the foundation for stock trading. Among these bulletin boards and servers in Trinidad, for example, are:

Ambionet/ECLAC	22-24 St. Vincent Street, Port of Spain
ACURIL	-provides Caribbean statistics: trade, tourism, other data
OPUS Network	basically runs games; also does conferences
Infoline	information for the Society of Computer users
NIHERST	Internet; e-mail service
Open Vision	online software library
UWI Engineering Dept.	

What do all of these dots and strokes have to with a regional stock exchange? To appreciate the essence of the servers and bulletin boards above, we need to understand the language of the Internet and outline how one accesses the Internet.

For an individual connection, the basics are a computer, a modem with the desired software, a phone line and a service provider. Today one has access to America Online, Dephi, CompuServe and Prodigy. Organizations such as Banks, stock exchanges will want multiple access. The key features would be to have a local area network [LAN] that connects all of the users, the operating system, the network software to a host computer, and to have a suitable modem. Outside communications would require a router to control the traffic within the organization, links to a high-speed communications line, and an Internet service provider to decode information from the superhighway to the computers in the organization's locale. There is no doubt that the initial investment is substantial in terms of the hardware and the software. In the long run, however, opportunities derivable from the investment can be manifold in terms of returns.

The system of which we speak is not the old electronic mail (e-mail) environment. Our focus is on the newest environment characterized by a system whereby local clients operating a set of software can connect to remote servers that are designed to distribute information. In a stock exchange environment, for example, an investor will have his own computer that interfaces with a server and brings information from a remote environment. The remote server merely stores information to be used when a client wishes to use the information. Today the two principal servers are **Gopher** and **World Wide Web (WWW)**.

Gopher was one of the initial "new" Internet tools. It was developed at the University of Minnesota and named for the University's mascot. Gopher allows searching hierarchically. You can search across a gopher file, within a gopher file, and across files. Gopher is limited in that text and graphics integrated in a file cannot now be delivered through gopher. Hypertext linking is not now supported (Frank Stumpf, 1995:3).

The newest generation of the Internet tools is the World Wide Web (WWW). WWW is an area of the Internet where documents, files, other data, video and sound are obtained via hypertext links. By pointing and clicking your mouse on the highlighted words and phrases, you can navigate around the world in seconds and obtain information wherever a **Home Page** is located.

Gophers are basically freeware. That is, they are available free to non-commercial users. Commercial users can negotiate a fee with the University of Minnesota. The National Center for Supercomputing Applications, NCSA, Mosaic browser is also essentially free. Today,

however, the WWW servers like NETSCAPE provide user support at a fee for use of the software. Of paramount importance, these newest servers have *data encryption* features for security and credit card entry protection. More about this later.

If there were a Caribbean Regional Stock Exchange, a NETSCAPE client, say, would point his mouse to a server providing the address of the CRSX or the URL, namely the Uniform Resource Locator. So for instance, the URL for the CRSX, Jamaica and St. Kitts may be:

http://www.crsx.com.html for the CRSX  
 http://www.crsx.com/ja.html for Jamaica  
 http://www.crsx.com/sk.html for St. Kitts

Basically, the URL includes the resources that are being accessed, the address of the server, the locale of the file. It normally closes with html, which stands for Hyper Text Markup Language. The HTML is really a collection of styles that define the various components of the WWW. If the above were in fact URLs on the NET, a person would be able to access the Caribbean Regional Stock Exchange generally, and the stock exchanges of Jamaica and St. Kitts, respectively.

### CONSTRAINTS TO IMPLEMENTING A CRSX

Thus far we have shown that the available technology of the Internet, the information superhighway, has the possibility of providing the base for investing across the region. We have made the case for accessing the technology, we have identified the systems around the world where automation is in existence, and we have identified the list serves in the Caribbean that could be accessed to permit regional investment. What, therefore, are holding back such an exchange? First, it may be argued that the technology is not yet widely available. Second, it could be argued that local stock exchanges may not be fully developed. There is merit in these two points. In addition to these two points, we want to consider four principal points that we believe will tend to be constraints to a Caribbean Regional Stock Exchange. If these four constraints are contained, a CRSX could be implemented. As we will demonstrate in the last section, the technology is there. All it may take it the initial money and the will.

In a full panoramic view of this picture of technology and the stock exchange, four constraints may loom large: (1) the cost of implementing the new technology; (2) the price regime to which regional stocks will have to adhere; (3) the technical rigidity of standardization, and (4) the acceptance of regional stock trading.<sup>3</sup>

First, the new technology of regional stock trading on the Internet will obviously have a high initial cost in terms of hardware and software. The time associated with ensuring accessibility across the region is not going to be inexpensive, in the short run. The time frame of learning the new system may thrust some users into a frame of reference whereby they may get turned off. This could be true, particularly, when the telephone lines are down, when there is noise on the line, or when there are other static interferences.

Second, it would seem that in the short run the pricing regime for regional stocks will be different from stocks traded in the domestic markets. This pricing difference may create a problem in that it may be counterproductive for the idea of regionalization of the stock exchange. Ultimately, however, this price constraint should only be short run. Regional costs

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<sup>3</sup>See Thomas M. Hoenig (1995:59) for some similar points relative to a payments system.

which diverge from domestic costs should be perceived as part of the risk element of investing regionally (and hence the return). Thus, with clear lines of pricing, the constraint to the pricing regime may be ameliorated in the long run.

The third constraint that may impede a regional stock exchange, may be the technical rigidity of standardization. The three current stock exchanges in the region, and those which will come on line, would have to ensure that there is some degree of standardization of the technology architecture such that there is an easy interface in terms of trading. This simple caveat is important, particularly in a commercial world where there are all kinds of systems that could be used. Fortunately, the new Internet, as exemplified through the World Wide Web now makes it possible for a greater degree of standardization, than was possible say five years ago. And in five years time, given the explosive developments in this technology, there should be greater degrees of synchronization of the technology.

Finally, if we assume a Robert Lucas-type rational expectations theory, vis-a-vis regional stock trading, stock traders, clients and brokers, then it may be safe to assume that traders will act rationally relative to economic risks and returns. In this regard, the traders/investors will want to balance domestic equities with regional equities. As the regional stock market assumes greater degrees of efficiency in terms of transfers of stock, payments mechanism, minimal noise in the markets, minimal distortions, traders may be more encouraged to invest/trade regionally. This is not to suggest that traders will not have some levels of reluctance in the proposed technology. The current system has many problems. It is not widespread (too narrow). In Barbados and Trinidad the domestic markets have low degrees of capitalization. In Jamaica, there are some questions about the degrees of manipulation [Jones-Hendrickson, 1994].

On balance, however, to put into effect a smooth institutionalization of a regional stock exchange @ [superhighway.internet.caribbean.com](http://superhighway.internet.caribbean.com) will depend on the commitment of the region to have effect systems that will be beneficial from a technological interface. Whether the region goes on the superhighway, in a large scale in the next ten years, or not, will depend on the speed of technological advance that regional businesses wish to pursue. It will also depend on the vision of the businesses and public sector of the role of technology and economic growth and development.

The limitations which once obtained as a result of size, location, and resource endowment, are today limitations which are manageable in a technological cyberspace. To date, there are only three stock exchanges in the CARICOM region. This should provide few walls of resistance for synchronization. Economies of scale and scope will certainly impact on the region, as a result of a move to regionalize the stock exchanges.

## **IMPLEMENTING A CRSX: CENTRAL BANKS AND BUSINESSES**

Central Banks in the region will have a pivotal role to play in fostering and encouraging a regional stock exchange along the lines we propose. They, and enlightened businesses, will undoubtedly have a great deal to benefit from the interface with the cyberspace.

First, Central Banks will have to put into effect, backed by the states, the enabling mechanisms to regulate the regional equity markets. There will have to be regulations of the stock market to ensure that there are minimum disequilibria in the goods and services market. Central Banks' role will not be one of regulators, but also one of marshalling the necessary forces to inform all sectors and actors in the region about the essence of the technology as it impacts on the stock exchange.

Central Banks will have to set a system, much like a regional Securities and Exchange System, to monitor the regional stock exchange, to try to militate against unfairness, to try to generate orderliness, and create some semblance of stability, in the limit. Naturally, there will be some instability in the market. This is the nature of risk and return in an equity market. Volatility is needed, but circuit breakers will be needed to minimize unusual volatility.

On this score, it is important that some safe guards are put in effect to protect domestic exchanges from price collapses intruding in domestic markets or sweeping across the regional market. For example, a price collapse in Jamaica may trigger a margin call in Jamaica from brokerage houses.<sup>4</sup> This, in turn, may force managers to liquidate positions. Such a collapse may have an impact on all of the markets in the region. There will be a need to have some guarantee. Each country should have protective mechanisms, like the features of the Treaty of Chaguaramas whereby a country can insulate itself from the domestic vagaries of a partner. The principle also obtains in the **Common External Tariff** where a country can use exemptions to protect some of its goods and services from being impacted by a partner's taxes or tariffs. This cordoning off of a domestic market from the negative spillover of a regional market is an issue that would have to be thought through carefully. It involves liquidity. In sum, the regulatory framework of a regional stock exchange will be vital to the growth of the exchange. And in the technology context which we are proposing, that regulatory framework is of tremendous importance.<sup>5</sup>

Businesses' role on the Internet is one that will have to move in line with developments internationally. We have already shown that there are NET sites in the Caribbean. More than 30 million persons are now Internet users. Today millions of persons are using the Internet as a pathway to obtain information, make purchases, and get entertainment. The proposed Caribbean Regional Stock Exchange could be operationalized if the current business technology is implemented along with the safeguards of a Central Bank and the inherent safeguards of equity markets.

Today, with minimal investment, a small business could establish its own Home Page and pulse information around the world about its products. The level of sophistication of the small business could be like the largest Fortune US corporation. The Internet provides a long run low cost of interacting with clients and customers. One of the key features of the Internet is the elimination of business friction between customer and company. Faxes, phone calls, brochures, paper orders and visits by sales people are replaced by a hit on a Home Page. Home Pages are always available with continuous information. Businesses, therefore, are no longer restricted by time zones, hours, geography or location. This frictionless state has the potential to create new markets, expand customer satisfaction and increase sales.<sup>6</sup>

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<sup>4</sup>A margin is a portion of money that a trader puts up to buy stocks on the assumption that the stock will rise. If the stock price falls, brokers will exercise a margin call and ask the trader to put up some money. If the trader fails to heed the call, the broker has the right to sell the stock to cover his position.

<sup>5</sup>See John Heimann, 1989; John O. Mathews, 1994 and Abken, 1993 for additional discussion along these same lines.

<sup>6</sup>See Forrester Research, Inc., in "Doing Business on the Internet: Intel and the Internet."

<http://www.Intel.com.ia.web.director/whitepaper.html>



How are some businesses using the Internet and how can this technology and this type of operation assist the region in implementing a Caribbean Regional Stock Exchange? At the moment a member of well-known US brokerage houses are permitting individuals and institutions to trade via the Internet. Fidelity of Boston, Charles Schwab, Dreyfus, to name a few are examples of the businesses which now have online trading. We have not even scratched the surface. The critical point to note, however, is the interface between stock trading, availability of technology, security and informational flow. These are the features that could be of assistance to a regional stock exchange.

Some of the developments involve software, banks and hardware developers. First, in an article entitled "Quicken Financial Network Launches, October 26, 1995, Intuit to Provide Internet Access Directly From Quicken," Intuit, the developer of the popular Quicken financial software notes:

*Now we are automating the communication between our users and the financial world. From this point forward, most of our products will be connected... (We will be) connecting our users to Intuit, to their banks and brokers, to financial information, and to each other.* (<http://www.intuit.com>), October 19, 1995.

In addition to the developments linking banks, brokers and clients, there is now a great deal of electronic data interchange. For example, some companies are now making it possible to have what is called "electronic consumer collectibles." This concept is a situation whereby companies can receive bills, make payments and do a variety of other transactions on the personal computer, the telephone and the modem. Currently, First Interstate Bank of California has such a system in place (<http://www.ccseb.com/fi/pr/eccpl.html>). First Interstate is the 14th. largest consumer bank in the USA and the largest in Southern California. It has 1,167 offices in 13 USA western states. In many respects, this type of system lends itself to the kind of networking that a Caribbean Regional Stock Exchange may engage in, given the regional diversity.

Mosaic Communications Corporation of Mountain View, California, one of the Internet providers, has been linking up with businesses to provide access, security and financial independence on the NET. In a November 14, 1994, dateline, Mosaic Communications Corporation and First Data Card Services Group- reputedly the world's largest credit card payments processor- teamed up to provide merchants, worldwide, electronic commerce on the Internet. Now, using a major credit card, there is now real time online purchases of goods and services (<http://www.ccseb.com/fi/pr/fdcfib.html>), [November 11, 1994].

The key issue for us in the Caribbean, as far as the Regional Stock Exchange is concerned, is the issue of security. In this regard, there is now technology that permits the security that could be used. There is now a data security technology, an *encryption code*, that creates a secure channel to prevent other people on the network from being able to get your code or use your code illegally. Indeed, the system is very much like the current technology whereby a person uses a personal identification number (PIN) to access financial information over the telephone from a brokerage house. This is also similar to the situation where, on a voice mail telephone system, one has to enter one's code to access messages. Essentially, it is now possible to send sensitive documents and information over the network, using an encryption code ([Banking@mcom.com](mailto:Banking@mcom.com); [info@mcom.com](mailto:info@mcom.com); <http://home.mcom.com>).

## CONCLUSION

In the final analysis, we have demonstrated that given: (1) the current technology of information as is exemplified on the information superhighway, the Internet and the World Wide Web; (2) the availability of netsites and Home Pages in the Caribbean; (3) the links of technology to economic growth and development; (4) the concerns of the ACS about



deepening and widening investment opportunities in the region; (5) the need to widen the equity and capital markets in the Caribbean, and (6) the fact that there exists technology that provides the security for financial transactions to occur without breaking fiduciary responsibilities, the case can be made for a Caribbean Regional Stock Exchange. A Caribbean Regional Stock Exchange using the Internet, should not be something too far away. Regional decision-makers have to ensure that they position the region on the cutting edge of the change that is taking place world wide. And there is now no better place to be than to be on the World Wide Web to establish that position. In a 1993 paper, published in 1994, the point was made that:

*We are in an era where computer and technological developments have made virtual reality of many issues and many things. Our borders (in the Caribbean) are porous. We are in the global village. Furthermore, we cannot continue to see features in linear dimensions. We have to see issues in a multidimensional cyberspace where critical thinking now forces us to think exponentially, and unconventionally, as opposed to conventionally and literally* (Jones-Hendrickson, 1994:26). The proposal of a Caribbean Regional Stock Exchange, (CRSX), fulfills this view of exponential thinking in cyberspace.

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