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TELEMATICS STRATEGY FOR AFRICA- THE CASE OF MAURITIUS

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Abstract:

There is very little understanding of the success factors of Telematics/Information Technology (IT) in developing countries. Poor infrastructure, limited foreign exchange, lack of skilled personnel and little or no management commitment are believed to be some of the key factors that limit the proper use of IT. There is a strong belief that telematics can help in bridging the gap between the poor and rich nations by making the former 'leapfrog' both economic and social development. However, introduction of such technology in developing countries should be a carefully planned exercise otherwise no value for money will be obtained for all scarce resources committed to this process.
The paper attempts to come up with the key factors that influence the implementation and proper use of telematics in developing countries by taking Mauritius as a case study. The present telematics process of Mauritius is examined and the problems encountered are analysed. Steps taken by the Mauritian government to solve the most urgent problems are then enumerated. Finally, an attempt is made to identify the key success factors for effective use of telematics in developing countries.

1. Introduction

The Republic of Mauritius is a 2000 square kilometre island situated to the east coast of Madagascar. It has a per capita income of approximately US$ 3,000 and its major income comes from sugar, textiles and tourism. Despite its geographic location and its lack of natural resources, the country has successfully moved from an agricultural based economy to an agriculture/industry based economy due to its cheap labour force. However, the country can no longer provide such inexpensive labour and there is a need to move up-market by producing value added goods and services. In this context, it is vital for Mauritius to harness the use of telematics/Information Technology(IT) in order to remain competitive on the global market especially with the coming up of the GATT accord.

There is very little understanding of the success factors of telematics in developing countries. Poor infrastructure, limited foreign exchange, lack of skilled personnel and little or no management commitment are believed to be some of the key factors that limit the proper use of IT. There is a strong belief that telematics can help in bridging the gap between the poor and rich nations by making the former 'leapfrog' both economic and social development. Yet, many developing countries, especially African states, have failed in exploiting the benefits of IT and there is evidence of underutilisation of IT equipment as well as failure of major IT projects [1, 2].

National and organisational conditions in developing countries (DCs) are very different from those in developed countries and it is inappropriate to apply existing Telematics/Information Technology experiences and research from developed countries to DCs. This paper attempts to come up with the key factors that influence the proper use of telematics in developing countries by taking Mauritius as a case study. The present computerisation process of Mauritius is examined and the problems encountered are analysed. Steps taken by the Mauritian government to address the most urgent problems are then enumerated. Finally, an attempt is made to identify the key success factors for effective use of telematics in DCs.

2. Telematics in Mauritius

The main sectors of the Mauritian economy will now be identified and the state of telematics use in these different sectors will be discussed.

The five main sectors of the economy can be regarded as follows:
- Public sector
- Agriculture and Agro industries
- Manufacturing
- Banking, Insurance and financial services
- Services sector

2.1 Public sector

The government is highly committed to the propagation of telematics in the country and to make effective use of telematics in the public sector. In 1989, it set up a number of bodies to look into the whole computerisation process of the public sector and of the country in general. These bodies are the Central Informatics Bureau (CIB), the State Informatics Limited (SIL), State Informatics Training Centre (SITRAC) and the National Computer Board (NCB). CIB looks into the planning and coordination of computerisation within the public sector while SIL and SITRAC are responsible for the computerisation of the government services and for the training of public sector staff respectively. The NCB guides the government on computer policies. Up to now, only 20% of the public sector has been computerised to varying degrees of satisfaction and a small percentage of public sector staff has been trained on low level courses such as wordprocessing, spreadsheets and databases.

2.2 Agriculture and Agro industries

The use of information technology in agriculture is limited to the sugar industries which are automated to a large extent and the Mauritius Sugar Industry Research Institute (MSIRI) which makes extensive use of information technology.

2.3 Manufacturing sector

Textile is the major manufacturing industry in the country. However, a recent survey carried out by the National Computer Board [3] indicates that only the large textile industries are making use extensive use of telematics. Most of the textile industries are using below 5 microcomputers to do transaction level processing such as stock control and payroll and do not have integrated production systems. The use of CAD/CAM and Computer Integrated Manufacturing (CIM) is limited to a few companies only.

2.4 Finance sector

The banking sector, insurance and financial services make use of telematics to various extents. Only the major banking, insurance and financial institutions make extensive use of IT and the main banks do offer services such as ATM, Visa card and Global access. The ATM services provided by any ATM are still limited to transactions for one particular bank only and not to a number of banks as is the case in developed countries. The country is presently working on a national electronic payment system which will later have access to global financial services.

Mauritius targets itself as being a focal point of the offshore business in the region. The Mauritian offshore sector was set up in 1991 and there are now 1,200 companies in operation. During the financial year 93/94, U.S $ 1.8 billion have channeled through the country. However, there is still no major use of IT in this sector but it will have an important role to play in the future expansion of the offshore business in the country.

2.5 Services sector

Tourism has been able to use the global reservations systems from its inception. However, a recent survey carried out by the National Computer Board [4] indicates that only the medium sized and large hotels are making use of IT to various extents. Some of the tour operators are making extensive use of IT. The government is presently working on market information system which will provide vital information to key players in the tourism sector in Mauritius and a destination information database which will contain information on the various facilities available in Mauritius and which potential tourists can consult from different parts of the world.

There has been virtually no increase in the sales of IT in 91/92 and 92/93 with an annual turnover of only U.S $22 million [5]. Figures in 93/94 show that there has been an slight increase in IT sales. The turnover from local software development amounts to only U.S $1.5 million for the year 92/93. The situation is no better for the year 93/94. This is an alarming situation since, in 1989, the Government took the bold initiative of promoting Mauritius as a software development and export country and had even created a parastatal body, namely State Informatics Limited, which would computerise the government services and develop high quality software for export.

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Providers of telecommunications are the Mauritius Telecom, a parastatal body, and there are private companies for cellular phones, PBXs and paging services. The provision of telephone service has now reached over 100,000 lines. Except for pay phones, all equipped with International Direct Dialing and access to the French Minitel system. The main exchanges are linked with fiber optics and a national packet switched network is being implemented. Moreover, the packet-switched network for overseas data transmission which operates at only 9600 baud will soon be replaced.

The audiovisual scene in Mauritius is monopolised by the Mauritius Broadcasting Corporation (MBC) which operates both the national radio and television. The MBC has till recently been regarded as a tool for government propagada but the situation is being remedied by the opening of new radio channels which tend to operate independently and the willingness on the part of government to deregulate this sector. The MBC makes extensive use of Information Technology but there is till now no concrete national telematics project.

As far as human resources are concerned, the country does not seem to be lacking any for the time being. In fact, there are many graduates in the field of IT who are either jobless for quite some time or are working for low salaries. However, it must be stressed that the country lacks professionals with experience in order to implement IT projects successfully. The majority of IT graduates are those nationals who have either studied abroad or at the University of Mauritius whereas the diplomates are trained locally either at the University of Mauritius which also offers a two year post Higher School Certificate (H.S.C) full time diploma course or the Mauritius Chamber of Commerce and Industry which runs a diploma course based on the French system. Mushroom private computer schools cater for ad hoc computer training and they are closely monitored by the Industrial and Vocational Training Board (IVTB), a government regulating body.

3. Solutions to major problems

Government can play an important role in the use of telematics as an investor, consumer and regulator. Government IT consumption in industrialised countries has been influential in determining the computer and communication standard in these countries[6]. Wong [7] elaborates on government's role in IT diffusion. It must be noted that though there is a willingness of the Mauritian government to promote the use of IT at the national level, things have not evolved up to the desired expectations. The country has not been able to promote itself as a software export country let alone it being able to carry out local computerisation projects satisfactorily. Schware[8] argues that it is necessary to build up the local expertise in software development before embarking on exporting software. The problem in Mauritius is that by creating SIL in 1989 and by giving it the monopoly to develop software for the public sector has hindered private computer companies to go into the software development business. In fact, most IT suppliers are only selling hardware and they have gradually decreased investment in software development and some have even closed their software development department because there is hardly any profit. This is shown by the turnover for local software development in the country which amounts to only U.S$ 1.5 million for 92/93. Major software developing countries like

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Brazil and India have around 6,000 and 700 software development firms respectively. In Mauritius the software industry has been literally wiped out by not opening up the public sector software market which is the largest source of computerisation projects. This has led to IT professionals being involved mainly in marketing and today there is hardly any IT professional with the relevant experience to implement IT projects satisfactorily.

3.1 IT Master Plan

IT has been introduced in a haphazard manner due to the absence of an IT master plan at national level for quite some time. As mentioned earlier, government is the major consumer and provider of information and can influence the propagation of IT/telematics at national level by having a proper master plan for IT use in the public sector. The World Bank will soon be finalising an IT master plan for the Mauritian government. Basically the Master plan for IT use in the public sector will have the following objectives:
- Deliver services efficiently and cost-effectively
- Rationalise and share data across the civil service
- Encourage IT diffusion at national level
- Ensure value for money for IT related projects in government

It has also been seen that computerisation in the past has been converting manual systems into automated ones without looking into how procedures could be streamlined. It is now a general trend that before any major computerisation, a re-engineering exercise is carried out to see how procedures could be streamlined and to get away with obsolete ways of doing things.

Moreover, the government will soon open up its software development and not limit it to SIL only. This is because by so doing, it will encourage the local IT industry to venture into software development which can then boost the national capacity to develop software and thus help Mauritius in developing software for export. Moreover, Mauritius has already signed the GATT agreement which means that it will have to open up its software market in any case.

The Government has also recently embarked on the Services Sector Modernisation programme with the objectives of facilitating the emergence of higher value-added activities and enhance competitiveness. It comprises the modernisation of the following services namely telecommunication, public sector and banking and finance.

3.2 Telecommunication & Audio-Visual sectors

According to a recent IT services workshop held by the National Computer Board of Mauritius, it was found out that :(i) the level of telecommunications services do not meet the business needs and networking possibilities are insufficient, resulting in isolated systems both internationally and locally (ii) access to international databases is insufficient and where available, rates are expensive and transmission speeds are low. The Mauritian government has recently embarked on the 'Tradenet' project which will allow trade

facilitation. All key organisations involved in the trade business will be linked electronically using Electronic Data Interchange. Such an important project will necessitate reliable telecommunications infrastructure within the country. Though the telephone lines can go up to 9600 baud, it is observed that data transmission normally occurs at 2400 baud only mainly because of old telephone exchanges.

The Mauritius Telecom has recently sucessfully provided Integrated Services Digital Network (ISDN 2B+D) services on a pilot basis. This will allow more efficient flow of voice, data, and images to and from any addressable computer. Moreover, a national X25 data network which will support services such as videotext, audiotext and electronic mail is being implemented. However, these improvements in the service have come long after they were due. The monopoly of Mauritius Telecom has had a negative effect on the level of service and investment in state of the art equipment in the telecommunications field. The Government is presently working on deregulation in the telecommunication field so that there is a market driven situation in the country resulting in effective competition in the telecommunications field.

As mentioned earlier (section 2.5) there has been till now the monopoly of the Mauritius Broadcasting Corporation (MBC) in the audio-visual sector. The government is conscious that such a situation cannot continue, hence its recent decision in June 1994 to set up the telecommunications advisory council which has the important role of giving a new dimension the telecommunication and audiovisual sectors in the country. There are new radio channels which are now operating in the country and the government is starting the deregulation of the audio visual sector by first allowing the use of satellite dishes. This sector will soon see the opening creation of new audio visual organisations which will compete for their survival. This will be beneficial to the nation at large and to the telematics sector in the country because these new organisations will have to master telematics in order to remain competitive.

3.3 Human resources

A report on IT manpower development indicates that the country will be needing on average 400 IT professionals annually over the next 10 years assuming an annual IT sector growth of 18% [9]. Thus, the supply of IT professionals on the local market which is approximately 80 graduates annually (including those who have studied overseas) is highly insufficient and there is an urgent need to produce more graduates. As mentioned earlier (section 2.5), there is right now a surplus of IT graduates on the local market mainly because IT investment in the country has remained almost stagnant over the past years. Nevertheless, there is an acute shortage of IT professionals with experience.

The University of Mauritius is mounting a number of courses and training programs to produce new IT professionals, to train existing ones and to create IT awareness among top managers. Organisations like IVTB, SITRAC and other private training institutions are also having recourse to external consultants for training on specialized topics such as client sever computing, object oriented techniques and business process re engineering.

The Ministry of Education is also trying to develop an IT culture among students by introducing IT at secondary level for the first instance. This will then be extended to primary schools as well. The Government has given special loans for the purchase of computers for households and today more than 6,000 families have bought computers under this scheme. However, much more need to be done in order to promote a true IT culture within the country and the National Computer Board will have to play an important role in this respect.

3.4 Legal framework

The existing legal framework needs to be looked at again with the challenges posed by the widespread use of telematics. New types of procedures and protection will be needed to deal with computer programs, databases, public and private registers and networks. Security problems must be viewed differently and rules of evidence in civil and criminal proceedings may have to be modified as computer-generated documents become part of every day life.

While the need for immediate action may vary among the various legal issues and jurisdictions, the need for change in most areas of law is inevitable given the impact which the use of telematics will have on society. To promote the use of IT in Mauritius and in order to make a smooth transition from yesterday's technology to the technology of tomorrow, changes in key areas of law such as intellectual property, data confidentiality and privacy, software protection and rules of evidence need to be looked into. The introduction and use of electronic data interchange (EDI) necessitates some changes, especially as far as rules of evidence are concerned. There needs to be stress on avoiding unnecessary constraints on the use of IT in future legislation by, for example, accepting computer documents as proof or as documentation for agreements or transactions that have taken place. It is also necessary to be able to verify the security and proper functioning of machines and human participation in transactions involving use of IT. A team comprising World Bank consultants and Mauritian professionals is presently working on the legal aspects of IT.

4. Strategy for Developing Countries

4.1 Role of Government

Government in any country is the major consumer and provider of information and as such has an important role to play in the propagation of IT within the country. First of all, the government should be committed towards using telematics at national level and believe that IT can help to support economic and social development of the country. Government should play the following major roles in order to make telematics a success:
* Government being a major provider and consumer of information, it can and has to influence telematics standards within the country
* Provide regulatory framework and policies as regards telematics

- Amend the existing legal framework to support IT diffusion and acceptance at national level

The country should have a master plan for the use of telematics at national level. The objectives of the master plan should be well defined and should be in line with the government's vision. The main sectors of the economy should be identified and the way telematics can help these main sectors should be worked out. Government should then start the ball rolling by first opening up the public sector computerisation. This will allow local companies to get a share of this big cake which will in turn strengthen the local IT industry and set IT standards at national level. Opening up the public sector computerisation is in itself a big task and should be carefully planned.

Incentives should also be given so that telematics becomes affordable to the public at large. Removing duty on telematics equipment, income tax exemption on IT investment as well as loans at low interest rates are some of the incentives. In many cases the services of a foreign consultant may be sought and schemes should be devised such that such a cost can be borne both by government and the organisation concerned. However, there should be well defined strategies for technology transfer once the consultant leaves the country. At the same time, the country should look at how it can train its local population by having special IT training programmes and courses. An IT culture should be inculcated within the nation at large by the various media and by introducing IT right from primary schooling.

Telematics will challenge the existing legal framework where paper documents and signatures are normally required. Thus, not only do the existing laws need to be amended to adapt them to IT but there should also be new legislation to cater for new problems due to introduction of IT. Some of the aspects of that need to be looked into are issues like data protection, electronic banking, telecommunication law, intellectual property and computer misuse legislation.

The problem of foreign currency has been a major obstacle for many developing countries to invest in telematics. However, this technology has become an essential tool in order to compete on the global market and it is up to the government to strike a balance between investment in IT and expenses in other areas. With a careful planning of IT introduction within the country, policy makers can reap the benefits of IT within a short lapse of time.

4.2 Role of Organisations

Once the government has set up the appropriate telematics framework, organisations should now respond by using telematics for their own benefits. The following are guidelines for telematics use in an organisation:

- Focus on management policy/policy goals not technology: Telematics should be regarded as a tool to support business and should be able to adapt easily to the ever changing business needs.

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- Measure clear, quantified targets and perform cost benefit analysis: The objectives of telematics use should be measured in terms of quantifiable targets e.g. instead of saying that processing time will be reduced, it will be more appropriate to say that processing time will be reduced by 30% in one year's time.
- Streamline first: Existing procedures should be looked into and redundant ones should be removed. Only then can telematics can be introduced for better efficiency. Many computerised systems which have merely been a replication of the old manual system are found to be inefficient because redundant procedures are still present.
- Benchmark: Examine the best method practised elsewhere before embarking on any major telematics project.
- Commitment among stakeholders: There should be a minimum commitment among the different users so that the new system will be a success. Users will be reluctant to accept the new system if they do not feel to form part of it and have not been involved right from the start of the project.
- Need for planning: Planning is important for any telematics project but sometimes such plans cannot be put into action for reasons beyond the organisation's control e.g. lack of foreign currency

5. Conclusion

Telematics can help developing nations to bridge the gap between the rich and poor nations through a proper implementation strategy. Government in developing countries should be committed towards telematics and should have an appropriate action plan to introduce telematics at national level. Government should play the following major roles in order to make telematics a success:

- Government being a major provider and consumer of information, it will have to influence telematics standards within the country
- Provide regulatory framework and policies as regards telematics
- Amend the existing legal framework to support IT/telematics diffusion and acceptance at national level

At the organisational level, top management should understand the benefits of telematics and be willing to invest in telematics in order to remain competitive on the global market. However, it should be borne in mind that introduction of IT/telematics at both national and organisational levels should a carefully planned exercise.

6. References

1. Avegrou C. and Land F. " Examining the appropriateness of Information Technology" in S. C. Bhatnagar and M. Odedra(eds) Social Implication of Computers in Developing countries, Tata McGraw Hill, New Delhi, pp26-41, 1992

2. Moussa A. and Schware R. "Informatics in Africa: Lessons from World Bank experience", World Development, 20(12), Pergamon Press Ltd, pp1737-1752,1992

3. National Computer Board, "Study on the use of IT in the textile industry", Port-Louis, Mauritius, 1992

4. National Computer Board, " Study on the use of IT in the tourism sector", Port-Louis, Mauritius, 1993

5. National Computer Board, "Hardware and software sales survey 91/92 & 92/93", Port-Louis, Mauritius, 1993

6. Ducatel K. & Miles I., "Internationalisation of IT services and public policy implications", World development, Vol. 20, No. 12, 1992

7. Wong S. H., "Exploiting IT, A case study of Singapore", World Development, Vol. 20, No. 12, 1992

8. Schware R., "Software industry entry strategies for developing countries: A 'Walking on two legs' proposition", World Development, Vol 20, No 2, 1993

9. National Computer Board, "IT manpower development framework", Port-Louis, Mauritius, 1992