

Review Article

Radiography of diagnostic imaging in Latin America

Gustavo Volpi*

DICOM IT, Argentina

Abstract

In recent years, Latin American countries have used their economic growth to improve their technologies applied to Healthcare. Both the private and the public sector are aware that the only way to improve the quality of life of people is through Health, Food and Education. This economic recovery is reflected in a steady and sustained increase in Healthcare spending, and together with the dependence on imports, generate an attractive business platform for industrialized countries. However, Latin America has its own specific characteristics that differentiate it from any other region. Reconditioned used equipments have the greatest spread, and their use is also very unique. These equipments are working tools: Radiology Technicians and Physicians are responsible for taking care of their workplaces, and they are the ones who daily oversee the proper use of equipment. There has been a marked decrease in the techniques used in Computed Tomography protocols, which use radiation doses much lower than those used in North America. This situation has led Latin American professionals to develop their own maintenance protocols, with a strong emphasis on preventive maintenance routines. These elements make that, nowadays, an increasing number of institutions incorporate Radiology Technicians, Physicians and Biomedical Engineers in the decision-making process for the purchase of medical equipment.

Introduction

In recent years, Latin American countries have used their economic growth to improve their technologies applied to Healthcare. Both the private and the public sector are aware that the only way to improve the quality of life of people is through Health, Food and Education.

While the public and private sectors pursue different interests, both are complementary and apply a synergistic influence in the development of Latin American economies.

According to the International Monetary Fund, the average growth in the region was 8% annually from 2004 to date. After an economic recovery in 2004, the economic development of Latin American countries was followed by a significant growth in the Medical Technology sector. Although this trend was deeply encouraged by countries such as Argentina, Brazil and Mexico, there were also other factors that marked negative indicators in these investments, as was the case of Venezuela, Peru and Colombia.

The way in which the Medical Imaging equipment business is structured in Latin America is an important aspect of this phenomenon. Exports of medical equipment are very limited, and approximately 80% of these exports are held by Mexico and Brazil. Even considering the total exports, there is virtually no domestic manufacturing, and most of the manufactured medical equipment corresponds to Multinationals installed in these countries for tax reasons, or in some cases, for regulatory and commercial purposes.

The vast majority of medical equipment comes from imports, and although the countries of origin have always been the United States and the European Community, in the last decade there has been a steady increase of imports from Asia, reaching almost 25% of total imports in Latin America [1].

This economic recovery experienced by the majority of Latin American countries is reflected in a steady and sustained increase in Healthcare spending, and together with the dependence on imports, generate an attractive business platform for industrialized

countries. However, Latin America has its own specific characteristics that differentiate it from any other region. First, Latin America is geographically very large, and combines rural areas, small towns and big cities in each region, along with different economic, social and cultural realities. This phenomenon does not resemble the realities of North America or Europe, where technologies depend on each country and share a single socio-economic-cultural reality. In turn, the difference between the poorest and richest sectors of the population is very pronounced, making a clear difference in investments and access to the newest technologies [2].

Unlike what happens in countries such as the United States or the European Community, Latin America's largest technology investments are held in major cities, within the larger, more specialized and highly complex diagnostic and health care centers. This generates a high concentration of patients, both from smaller regions and from those with technological limitations, added to all referrals of patients from the diagnostic centers with less equipment, in the same region. This particular concentration of patients and technology, results in a much slower implementation of new technologies than in industrialized countries.

Secondly, it is clear that the major investment and most important technological developments in Latin America are generated in the Private Sector, while in Europe this is almost exclusive to the Public Sector. It is at this point where the reality of Diagnostic Imaging follows two distinct paths. The Public Sector focuses on providing the greatest possible coverage, while the Private Sector focuses on providing a better quality of service. However, although both sectors intend to follow the same trends, this is clearly different in each case. In Latin America, the trends in Medicine are advertised and promoted by the

Correspondence to: Gustavo Volpi, DICOM IT, Argentina, **E-mail:** gustavogvolpi@gmail.com

Received: March 01, 2016; **Accepted:** April 15, 2016; **Published:** April 20, 2016

Public Sector, but seldom implemented. Among the latest trends we may mention Preventive Medicine, citing as an example the prevention of cardiovascular disease, one of the most important in the first world, using 64-slice Computed Tomography equipment. However, the cost of these equipments is almost unattainable for the Public Sector in Latin America. Making a less invasive medicine is another trend, but like preventive medicine, this requires technologies that the Public Sector cannot face on a massive scale. Finally, there is a clear trend towards education and continuous training. In Latin America the training and professional education programs are made by the Public Sector, but the small number of Teaching Hospitals and poor building infrastructure, forces professionals to be trained in the Private Sector. In the same way, this creates a particular pace for the Private Sector, because it seeks to improve the quality of the service, but at some point it must recover investments. This results in a mismatch in trends in Medicine, comparing to the Public Sector, since the Private Sector implements the trends, but for a specific audience, and at the lowest possible cost.

In Latin America, 90% of pathologies, and frequent and daily medical situations can be solved with equipments of ultrasound, 1T Magnetic Resonance Imaging, 4-slice Computed Tomography (although there is a trend to 16-slice computed tomography, which is close to becoming standard), conventional Mammography and conventional Radiography. And this is where the Private Sector aims. It is very common that Private Diagnostic Imaging Centers only have this kind of equipment [3].

Even though multinational companies that manufacture medical diagnostic equipment make their best effort to sell their products, the Latin America market is still led by USED equipment, mostly coming from the United States and Europe. There are many companies trying to sell very low-quality products, without after-sales service, no warranty or training. However, in recent years a set of very specific and stringent controls to allow the import of used equipment for diagnostic medical has been implemented in almost all Latin America.

It is worth highlighting some specific cases, for example Chile. Due to a free trade agreement with the United States, Chile has been the country with greater development of the Region, and the United States being, of course, its largest supplier. In the case of Argentina, the import restrictions set out in late 2011 along with the currency exchange control drastically reduced the amount of imports, leading the country to a state of almost total closure, producing an economic isolation of the sector.

Mexico, which also signed a free trade agreement with the United States and has the benefit of its geographic proximity to that country, is the second importer of medical equipment in Latin America.

The restrictions of each country for the import of used diagnostic imaging equipment must be added to all these factors. These restrictions, in many cases, are based upon certain age of the equipment and on the requirement that the equipment is refurbished to ensure that it meets all the manufacturer's specifications. Today, almost all Latin American countries require a local record of the equipment to be imported, as well as the certification of origin, along with the approval for the commercialization of medical equipment, issued by the United States Food and Drug Administration (FDA) or the European Conformity (CE).

Another major constraint is the Public Sector. The Public Sector in the region is only allowed to purchase NEW medical equipment. However, as most of the development occurs in the Private Sector,

Used Refurbished equipments¹ are the ones who mark the volume of imports. Finally, the work of technical and medical staff in Latin America must be mentioned. Research opportunities are very scarce, and research resources are almost non-existent. This makes radiology technicians to devote their time almost entirely to care activities.

The same goes for interventions; 90% of radiology technicians are dedicated strictly to Diagnostic Imaging; only 10% performs interventions, and always in the company of the relevant medical staff.

These activities directly impact on the pocket of technicians and physicians. While in developed countries the research tasks are the best paid, in Latin America they are almost nil. Interventions with Diagnostic Imaging equipment have additional payments, but require greater preparation and more time, so that the technicians and physicians often prefer to perform only Medical Imaging, pointing to a greater volume and therefore higher income. It is no coincidence that there is virtually no prophylactic holiday for Radiology Technicians in the region. While all countries have been commissioned to regulate and legislate prophylactic holidays to ensure the health of the technical and medical staff, it is very common that technicians use prophylactic vacation to cover positions in other diagnostic centers, and thus improving their income, often at the expense of their health [4].

The realities of Latin American economies against the U.S. dollar or the Euro also create situations that are characteristic for the region. Refurbished used equipments have the greatest spread, and their use is also very unique. While in developed countries the life of Diagnostic Imaging equipment is 5 to 7 years, in Latin America this period extends up to 15 years in some cases. And in many cases, used equipment is utilized until exhaustion of its useful life. The care thereof is also distinctive. Replacement of parts by new spare parts is often so expensive that sometimes it matches the price paid for the used equipment. For example, a new x-ray tube of a 4-slice Computed Tomography, like a DURA Akronb, costs about 56,000.00 US\$, while the used CT-scanner is achieved by 50,000.00 US\$. This situation has led Latin American professionals to develop their own maintenance protocols, with a strong emphasis on preventive maintenance routines. Another important aspect is the repair of damaged parts. In the region, the repair of damaged parts is always attempted, while in developed countries these are immediately replaced with new parts. This has resulted in a refurbished used parts business, which has also been attractive for North American and European countries.

It is worth pointing out that these equipments are, in all cases, working tools, and Radiology Technicians and Physicians are responsible for taking care of their workplaces, and consequently, they are the ones who daily oversee the proper use of equipment. In this way it can observe, for example, a marked decrease in the techniques used in Computed Tomography protocols, which use radiation doses much lower than those used in the United States. In this respect the technician, in addition to attempting to irradiate less and caring for the patient, is also the one who helps to reduce costs and maximize the input, by fulfilling a merely economic purpose: the care of the x-ray tube. This phenomenon can even be observed on Automatic Dose Control equipments. Another clear example of the Latin America reality focuses on the features of equipments that lead the market. Due to the costs difference, there are almost no 32-slice Computed tomography equipments, since similar 64-slice equipments can be achieved for a very little money difference. In turn, this creates a new business segment, which is based on purchasing 32-slice computed tomography equipment to use only as spare parts. Another example

lies in the performance of the equipment. TOSHIBA's experience with 16-slice equipment was very unique. TOSHIBA virtually withdrew all Activion equipments from the market. These equipments have the characteristic of being 16-slice, but with a small x-ray tube. That is, it is presented as a 16-slice TOSHIBA Aquilion, but with a TOSHIBA Asteion x-ray tube. This seemed an attractive proposal, but the poor performance of the x-ray tube (being a 4-slice tube) made this initiative fail in the United States.

However, TOSHIBA Activion equipments were all the rage in Latin America, only because of their low cost. TOSHIBA presented its proposal as a 16-slice equipment with a cheaper x-ray tube, and that was enough.

This experience served other companies to direct their products to market, and thus arose, for example, the Philips MX000 IDT, being a 16-slice equipment like the Philips Brilliance16, but with an x-ray tube of a Philips MX8000 Quad. Finally, there is an ultimate determinant for Radiology in Latin America which is technical support. The same issue occurs in the entire region: manufacturers do not provide technical support to used equipment. This generates a very important market of professional services and training in the region. And at the same time, it conditions the selection of used equipment to import. Companies such as Philips and Siemens use complicated passwords and licenses to protect their software and applications, thus complicating the task of engineers who must repair this used equipment. On the other hand, companies such as Toshiba and General Electric have chosen to develop their software and applications on open source platforms, and with less security. Over the past years users of new equipment in the United States and Europe have begun to take into account this situation, since the possibility of equipment resale started to be an option. Because almost all the equipment purchased in the United States is new, and after a few years this equipment would be allocated to Latin America, institutions have begun to assess resale options and costs, and have realized that it is much easier to sell equipment to Latin America if they are easier to repair, or if the spare parts costs are lower [5].

All these elements make, nowadays, an increasing number of institutions in Latin America incorporate Radiology Technicians, Physicians and Biomedical Engineers in the decision-making process for the purchase of medical equipment.

Conclusions

The economic recovery of Latin America has resulted in a sustained increase in spending and investment in medical equipment in the past few years.

Diagnostic Imaging has managed to position itself as one of the most important methods in worldwide medicine, but the acquisition and development of new technologies strongly depend on the socio-economic realities of each region in particular. Emerging economies have led to a new universe of opportunities in Diagnostic Imaging, with its own rules and features.

In Latin America Radiology Technicians, Physicians and Biomedical Engineers have a key role for the development and deployment of technologies, due to the strong predominance in imports of refurbished used medical equipment. The quality of Diagnostic Imaging services seriously depends on the human resources of institutions, and secondly, on the deployed technologies.

References

1. Castells M, Gimeno CM, Alborés J (2005) La sociedad red Alianza. International Monetary Fund. World Economic Outlook Database.
2. World Health Organization (2010) World health statistics 2010. World Health Organization.
3. Revista "El Hospital", Administración hospitalaria, Nuevo o reacondicionado, Revisión de la normatividad por país, Julio 2009
4. Revista "El Hospital", Avances tecnológicos Tendencias de las imágenes médicas en América Latina, Ricardo García-Mónaco, Marzo 2007
5. Revista "El Hospital", Informe especial Equipos de imágenes médicas en América Latina, Germán González-Redactor de El Hospital, Octubre 2011