

Spinal Cord Stimulator Market Analysis and Forecast

By

Vikas Sharma

*Dissertation submitted for the partial fulfillment of the
MBA Pharmaceutical Management*

Academic year, 2015-2017



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TO WHOMSOEVER MAY CONCERN

This is to certify that Vikas Sharma of MBA Pharmaceutical Management from The IIHMR University, Jaipur has undergone internship training at Future Market Insights, Pune from 06th February, 2017 to 12th May, 2017.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.



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May 5, 2017

TO WHOM IT MAY CONCERN

This is to certify that **Vikas Sharma** pursuing **MBA - Pharmaceutical Management** from **The IIHMR University, Jaipur** has successfully completed Major Project/ Dissertation in our organization on the topic, **"Global Spinal Cord Stimulators Market"** from **February 6, 2017 to May 12, 2017**.

During the project tenure in the organization, we found **Vikas** is hard working, sincere and inquisitive.

We wish him all the best and success in his future endeavors.



The stamp is circular with the text "Future Market Insights Global & Consulting" around the perimeter. A signature, "Dilip Saha", is written across the center of the stamp.

Chief Operating Officer

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **“Global Spinal Cord Stimulators Market Analysis and Forecast”** submitted by **Vikas Sharma** Enrollment No. **IIHMR-U/01/2015-17/ 0052** under the supervision of **Dr. Sandeep Narula** for award of **MBA Pharmaceutical Management** of the University carried out during the period from **06th February 2017 to 12th May 2017** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.


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This is to certify that all ethical issues have been considered while collecting data for my dissertation titled **“Global Spinal Cord Stimulators Market Analysis and Forecast”**

Vibha Sharma
Signature of student

Acknowledgement

The satisfaction and euphoria that accompany the successful completion of the project would be incomplete without the mention of the people who made it possible.

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I hope that I can build upon the experience and knowledge that I have gained and make a valuable contribution towards the industry in coming future.

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Executive Summary

- Global spinal cord stimulators market revenue is expected to increase at a CAGR of 6.4% during the forecast period (2016-2027)
- In terms of revenue, rechargeable spinal cord stimulators dominated the market in 2016. The segment is expected to continue to dominate the market, owing to focus of companies on the development of devices with longer battery life.
- North America spinal cord stimulators market accounted for largest revenue with market share of 74.7% in 2016, and is also expected to register the fastest CAGR of 6.6% during the forecast period due to better reimbursement policies and presence of key players.
- FBSS was the biggest application area for spinal cord stimulation in 2016, owing to higher failure rate of spine surgeries. FBSS is expected to continue to dominate the market over the forecast period.

1. Introduction

Pain can be categorised as, nociceptive pain and neuropathic pain. Nociceptive pain is a dull, thumping pain which is the result of irritated nerves after physical tissue injury. This condition is common in case of cancer or after a fracture. Nociceptive pain can be treated or managed with pain medications such as opioid and/or anti-inflammatory. Neuropathic pain is defined as burning, shooting, or shocking pain. This type of pain is a result of nerve damage or abnormal nerve conduction such as pain associated with failed back syndrome, complex regional pain syndrome, post-surgical pain, neuromas and shingles. Neuropathic pain is resistant to the treatment with analgesics or pain medicine.

Neurostimulation is considered an effective treatment option for the management of chronic neuropathic pain. Neurostimulation or neuromodulation is a reversible therapy which can even be tested before permanent implantation. Spinal cord stimulation is a type of neurostimulation which is being used for the effective management of chronic pain.

1.1 Spinal cord stimulation

Spinal cord stimulation (SCS) is a reversible, non-destructive, neurostimulation procedure in which therapeutic doses of mild electrical current is delivered to the spinal cord or to the targeted nerve. The low-voltage modulation interferes with the transmission of pain signals and blocks the pain. The use of SCS started after Melzack and Wall introduced gate control theory for pain control in 1965. It was noted that modulation of large myelinated fibers of peripheral nerves results into paresthesias and blocked the activity in small nociceptive projections. In other words, pain receptors compete to each other and to other sensory nerves. Appropriate stimulation of competing nerves can effectively block a pain signal. The SCS system is implanted in a space around the spinal cord, called the epidural space, where it modulates the dorsal columns which can block the sensation of pain by producing a tingling effect.

1.1.1 Indications

The most common indications are failed back surgery syndrome (FBSS), reflex sympathetic dystrophy (RSD) or complex regional pain syndrome (CRPS), angina and ischemic limb pain. Various reports regarding the treatment of chronic pain due to other conditions such as,

cervical neuritis pain, visceral/abdominal pain, post-herpetic neuralgia, spinal cord injury pain, and neurogenic thoracic outlet syndrome have also mentioned in various studies.

1.1.2 Patient Selection

Some of the criteria listed below can be used to determine suitable candidates for neurostimulation:

- Conventional treatment methods have failed to adequately control the pain.
- Further traditional surgical intervention is not specified.
- No serious untreatable drug addiction for the pain condition exists.
- Psychological assessment and clearance for implantation of device have been received, sorting out untreated depression or anxiety, addiction, or other behavioural disorders.
- No medical issues exist that can present problems during the surgery.

The actual spinal cord stimulation procedure is done by pain specialists, neurosurgeons, anaesthesiologists, or other trained specialists. Implantation of SCS device is a complex but minimally invasive process and it is better to be carried out by trained and experienced specialist.

Neuromodulation with Spinal Cord Stimulator starts with a trial phase followed by permanent implantation, if patient is compatible and responses positively to the effect of spinal cord stimulation.

1.1.3 Trial Phase

Spinal cord stimulators implantation is a two stage procedure. The physician will insert a hollow needle into the area surrounding the spinal canal, while watching on a monitor. Through this passage, one or more thin leads are inserted; each has a number of small electrodes at the end. These leads are connected to a source of power that transmits a low-voltage current. The doctor will adjust the electrodes with feedback from the patient, until the area with pain sensation is affected by a tingling effect called paresthesia. Once the position is decided, electrode is placed. Rather than inserting a cylindrical hollow lead, some

specialists prefer to go along with a minor surgical process and directly implant an electrode in area that needs to be stimulated. Generally, a trial phase is provided and in most countries, reimbursement for permanent implantation will only be offered if an appropriate result to the trial phase is obtained. A result is usually considered satisfactory if pain is minimized by approximately 50% even though progress in function and level of activity may also be considered. The patient spends trial phase of around seven days (which can be less or more) with an exterior pulse generator which is being carried in pocket or on belt. Doctors will explain to patient the procedure to use the device and how desired results will be measured. Generally, the trial period is spent at home. Patients get a handheld control unit. This permits them to change between programs during the day in order to obtain adequate result in various postures, such as lying or sitting.

1.1.4 Permanent Implantation

After the completion of trial period of about a week, those patients who are experiencing a reduction in pain approximately by 50% may decide to continue to use the system and go along with the permanent implantation. Some physicians will use the existing electrode from the trial phase and others may remove the older electrode and insert a new electrode. For patients going for a permanent SCS implantation, an implantable power battery, with an implantable pulse generator is usually placed below the skin – either in the upper chest wall, upper buttock/back, or abdominal area. While the cut made on the patient's back generally heals within a few days, but surgical pain from the implanted device may last up to six weeks. Patients are advised not to do stretching or twisting activities which may relocate the system.

1.1.5 Benefits

Neurostimulation has shown up to 50% improvement in pain relief, reduce the use of medications, and allow the person experience an improvement in their quality of life. These benefits are expected to increase with improvements in the technology and in understanding of how pain signals are generated and gated in the nervous system. It is important to realize that neurostimulation is a treatment option along the continuum of pain control.

1.1.6 Potential Adverse Effects

Surgical risks associated with an implant include hematoma, infection, and possible leakage of cerebrospinal fluid. Because this is a device, there can be malfunction of the hardware or can have disruption in the settings by other signals; for example, patients with an SCS are advised to turn it off before going through an anti-theft device in a retail store; additionally, patients with an SCS cannot undergo a magnetic resonance imaging (MRI) scan. Major complications associated with spinal cord stimulators, however, are rare; although in worst case scenario complications of the implant can cause paralysis, nerve injury and death.

1.2 Segmentation

For the analysis purpose global spinal cord stimulators market has been segmented on the basis of Product Type, Application and Region.

1.2.1 Product Type

There are two type of spinal cord stimulators are available in the global market and these products are categorised on the basis of power source.

- **Rechargeable Spinal Cord Stimulators**
 - These devices have rechargeable power source connected to the implantable pulse generators.
 - Rechargeable batteries are charged by inducing with a charging unit placed above the implantable pulse generator for about an hour or two after every few days depending on the use and programming chosen.
 - A rechargeable device can have battery life between 10 to 25 years, depending on the manufacturers.
- **Non-Rechargeable Spinal Cord Stimulators**
 - These devices have primary cell as a source of power. Non-Rechargeable spinal cord stimulators are generally bigger in size and are less costly but these devices have lesser battery life.
 - However they are easy to operate and if operated at standard rates may last up to five years before replacement.

1.2.2 Application Area

On the basis of the therapeutic application or various chronic pain indication has been categorised as:

- **Failed Back Surgery Syndrome (FBBS)**
 - Failed Back Surgery Syndrome is a term used to describe the chronic back or neck pain condition which occurs when spine surgery has not been able to achieve the desired result.
 - Specifically, the term is used when spine surgery has not treated or managed the problem or has caused other problems, resulting in worsening of pain.
- **Complex Regional Pain Syndrome**
 - Complex Regional Pain Syndrome is an uncommon neuropathic pain condition that usually affects arms or legs.
 - CRPS usually develops after a surgery, injury, stroke or heart attack. This condition worsens with the time.
 - This condition is also called as Reflex Sympathetic Dystrophy Syndrome.
- **Ischemic Limb Pain**
 - Ischemic Limb Pain is a serious, peripheral arterial disease caused due to restriction of blood supply to tissues resulting shortage of oxygen and glucose. Pain can be divided into:
 - Vascular Pain, originating from the vessel wall
 - Somatic Pain, tissue ischemia related
 - Nerve Pain, caused by ischemia of the nerve trunks.
- **Others**
 - There are several other conditions are being treated or managed using spinal cord stimulators including Arachnoiditis, Angina, Degenerative Disk Disease, Peripheral Vascular Disease, Multiple Sclerosis and Spinal Cord Injury.

1.2.3 Regions

Global market has been divided into four regions.

- North America

- Europe
- Asia Pacific
- Rest of The World (Latin America, Middle East and Africa)

2. Review of Literature

Spinal cord stimulators have been in the market for more than 40 years. But it started gaining popularity as a choice of management of chronic pain from last decades. Reason for gaining popularity is the favourable results of various researches conducted since the inception of these devices.

According to report published in The Korean Journal of Pain by Young Hoon Jeon, MD (2012), SCS is an effective treatment in number of painful syndromes. Spinal cord stimulators can reduce pain up to 50% and provide long term relief from pain with a concomitant improvement in the quality of life, daily function, and patient satisfaction, although the initial costs may be high. The assessment and control of emotional and cognitive variables allows better adjustment for the patients to the SCS technique, limits the chances of the therapy being applied inappropriately, and enhances the satisfaction of the intervention in the long term.

According to a research report by Dr Krishna Kumar and Dr Syed Rizvi (2013), spinal cord stimulation treatment and conventional treatment together is cost effective as compare to conventional treatment methods alone. Especially, in severe conditions such as, failed back surgery syndrome, complex regional pain syndrome, peripheral arterial disease and peripheral arterial disease. Significant cost savings can be achieved with the use of this therapy compared with CMM. Clinicians, researchers, and advocacy groups must continue to evaluate treatment efficacy, cost-effectiveness, and economic trends in determining patient access to treatment.

According to a report published in Journal of Pain Research, 2016 by Chantelle Sinclair, Paul Vellris and Adele Barnard, SCS is a safe, clinical, and cost-effective treatment for many chronic pain conditions. Indeed, the field is rapidly evolving, and there is now Level I evidence for newer techniques including HF10 SCS and DRG SCS, which demonstrate dramatic improvements in overall efficacy in reducing pain in specific conditions, including failed back surgery, back pain, neuropathic leg pain, and complex regional pain syndrome. Furthermore, the field has increasingly met the challenge of not only having newer devices to achieve these outcomes but concurrently reducing the risks of complications and adverse events. The data supporting SCS in its multiple forms are compelling and have reached a level that now demands that this therapy be considered earlier in the treatment continuum and to be no longer regarded as simply an end-stage salvage therapy.

According to a report presented at the annual meeting of the North American Neuromodulation Society (NANS), 2017 sponsored by Abbott, patients who received spinal cord stimulator, opioid use declined or stabilized in 70% of the patients. Opioid has been considered as a preferred choice of the management of the chronic pain and use of opioid over a long period of time lead to the addiction. Opioid addiction and abuse are growing problems in the United States. But use of spinal cord stimulation can reduce the opioid use. Patients who had a successful spinal cord stimulation implant had significantly reduced opioid use 1 year post-implant, whereas patients who removed their implant saw an increase in their opioid use again over time. Specifically, 93% of patients who continued on spinal cord stimulation therapy had lower average daily morphine-equivalent doses vs. patients who had their implants removed.

3. Rationale

Chronic pain is a debilitating condition that is associated with significant medical, emotional, and economic burdens. According to the report of The Global Burden of Disease Study, burden of chronic pain is higher than any other condition, including major depression, diabetes and heart disease, on this measure. According to WHO, approximately 20% of global population suffer from various chronic pain conditions. Chronic pain is a healthcare burden on the economy of countries which includes treatment cost as well as productivity loss. Spinal cord stimulation is the most effective treatment measure in the management of pain.

This report provides information on:

- Market potential for companies who wants to launch their own spinal cord stimulator.
- Most preferred type of device.
- Biggest market for spinal cord stimulators.
- Indication for usages of spinal cord stimulator.
- Major Competitors
- Factors driving the growth

4. Research Question

- What is the market potential of spinal cord stimulators in patient suffering from various chronic pain conditions globally?

5. Objectives

- To understand the market potential of spinal cord stimulators.
- To identify the factors driving the growth of spinal cord stimulators market.
- To identify the dominating segments in the spinal cord stimulators market.

6. Methodology

Type of Study- Secondary Data Analysis

Data Collection Tools- Secondary Data Source (Company Annual Reports, various research articles and publications). Two approaches were used to predict and forecast the market. Data was triangulated using both approaches.

Primary Approach-

First of all Market players were identified who are offering spinal cord stimulators. There are total six players in the global market, four of them are major players and two are minor players. Then product mapping was done and all the product offerings were noted. Financial reports of all the companies were studied. Revenue of the companies from the segment was identified and also revenue generation for the segment from various regions was identified. These financials of companies were studied for last three years. Epidemiology study of various chronic pain conditions was done and severity of conditions was noted. Various presentations of companies were also studied on the spinal cord stimulators. Scientific journals and magazines were studied to understand the potential of market. Market estimates were confirmed through discussion with industry experts from various regions. CAGR was set for all the segments on the basis of company financials and FMI's internal trend setting model considering the growth factors. On the basis of this trend setting method market was forecasted.

Secondary Approach-

Number of devices implanted every year for last three years were identified using the data provided by International Neuromodulation society and this data was confirmed with industry experts. Average selling prices from various regions were identified as provided by various insurers and reached to the market size.

Data Analysis Tool- MS Excel

Study Duration- Three Months (6th February to 5th May)

7. Data Analysis (Findings and Forecast)

7.1 Global Market

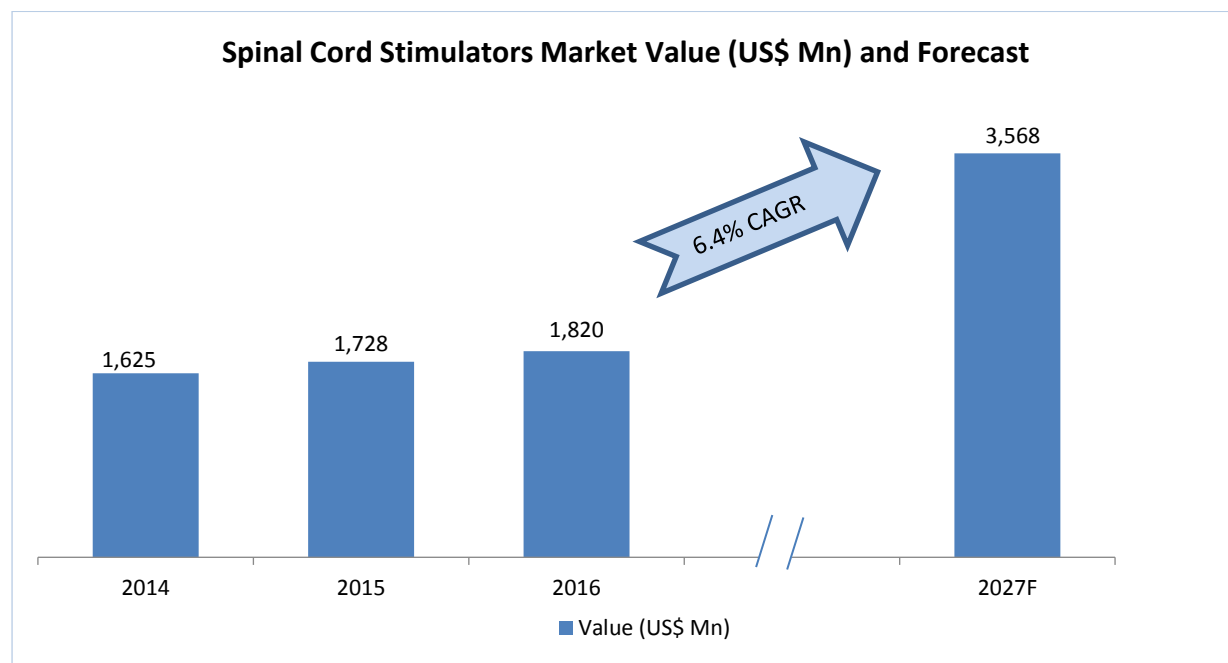


Figure 1 Global Spinal Cord Stimulators Market Value (US\$ Mn) and Forecast (2016-2027)

Fig 1 shows that global spinal cord stimulators market was US\$ 1820 in 2016 Mn and is expected to grow at a CAGR of 6.4%. Global market is expected to reach to US\$ 3568 Mn by 2027. Even though Spinal Cord Stimulators are there since, 1967 but it started getting popularity since last decade only. Effectiveness of Spinal Cord Stimulators over conventional medication treatment is expected to drive this growth.

Fig 2 shows the absolute \$ opportunity for the global spinal cord stimulators market over year-on-years. The global spinal cord stimulators market is expected to represent an absolute \$ opportunity of US\$ 99.4 Mn in 2017 over 2016 and US\$ 106.8 Mn in 2018 over 2017. It is also creating an incremental opportunity of US\$ 1748.2 Mn between 2016 and 2027.

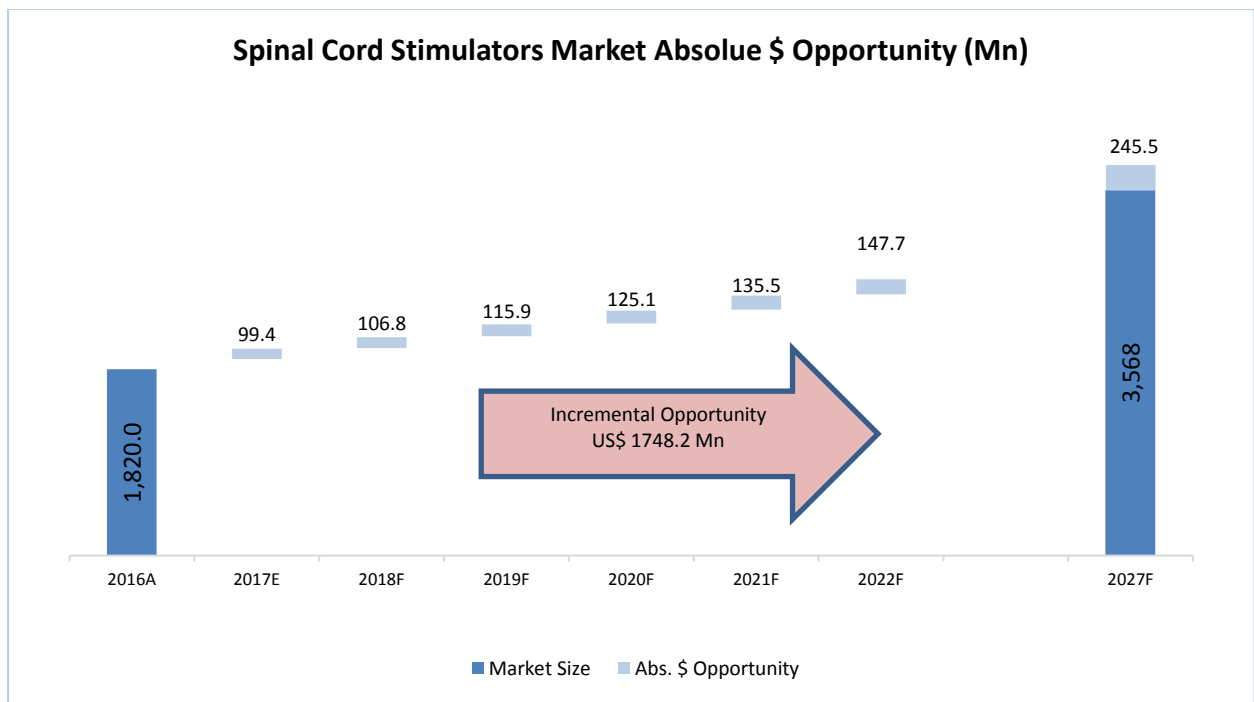


Figure 2 Spinal Cord Stimulators Market Absolute \$ Opportunity (US\$ Mn)

7.1.1 Global Spinal Cord Stimulators Market Value (US\$ Mn) By Product Type

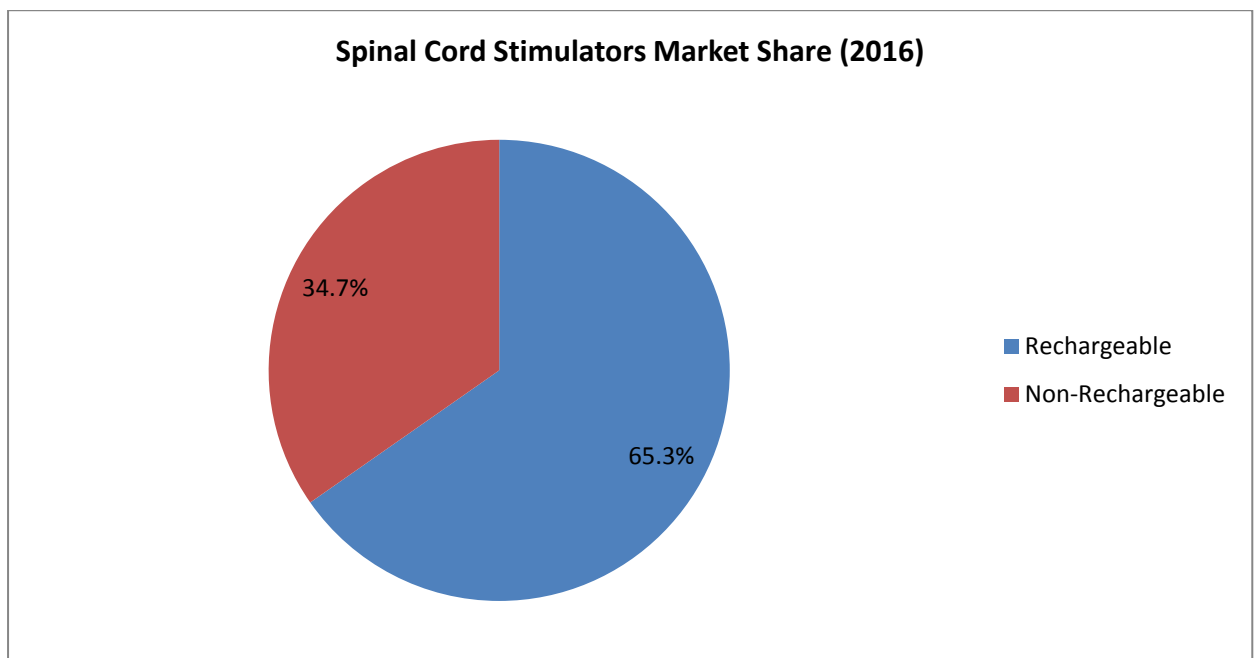


Figure 3 Spinal Cord Stimulators Market Shares (2016)

Fig 3 shows that globally, 65.3% rechargeable spinal cord stimulators are used as compared to 34.7% implantation of non-rechargeable spinal cord stimulators. Rechargeable SCS has

longer battery life as compared to non-rechargeable SCS, making rechargeable devices cost effective in long run. Also, a surgical procedure has to be performed every time to replace battery. Due to these factors rechargeable devices are used more.

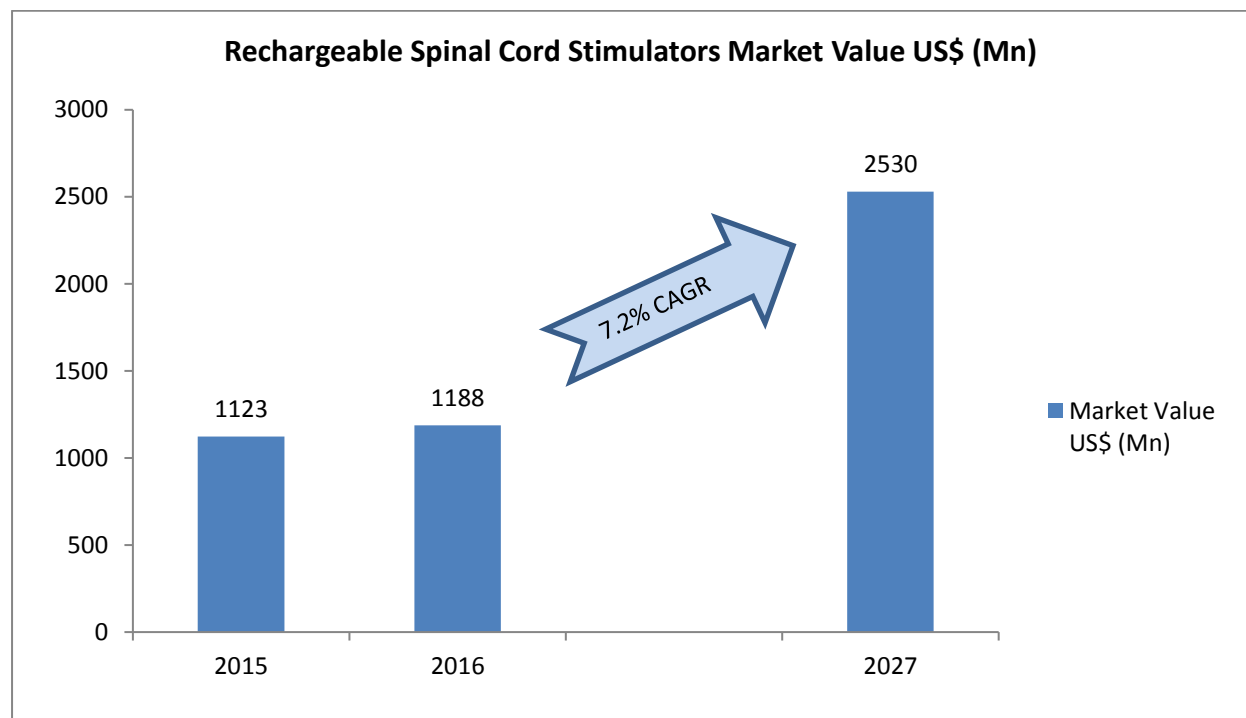


Figure 4 Rechargeable Spinal Cord Stimulators Market Value US\$ Mn (2015-2027)

Fig 4 shows global rechargeable spinal cord stimulators market, which is expected to grow at a CAGR of 7.2% which more than global average CAGR of 6.4%. Rechargeable spinal cord stimulators market is expected to reach a value of US\$ 2530 Mn by 2027 as compare to US\$ 1188 Mn market in 2016.

Fig 4 shows global non-rechargeable spinal cord stimulators market, which is expected to grow at a CAGR of 6.4% which less than global average CAGR of 6.4%. Rechargeable spinal cord stimulators market is expected to reach a value of US\$ 1038 Mn by 2027 as compare to US\$ 632 Mn market in 2016.

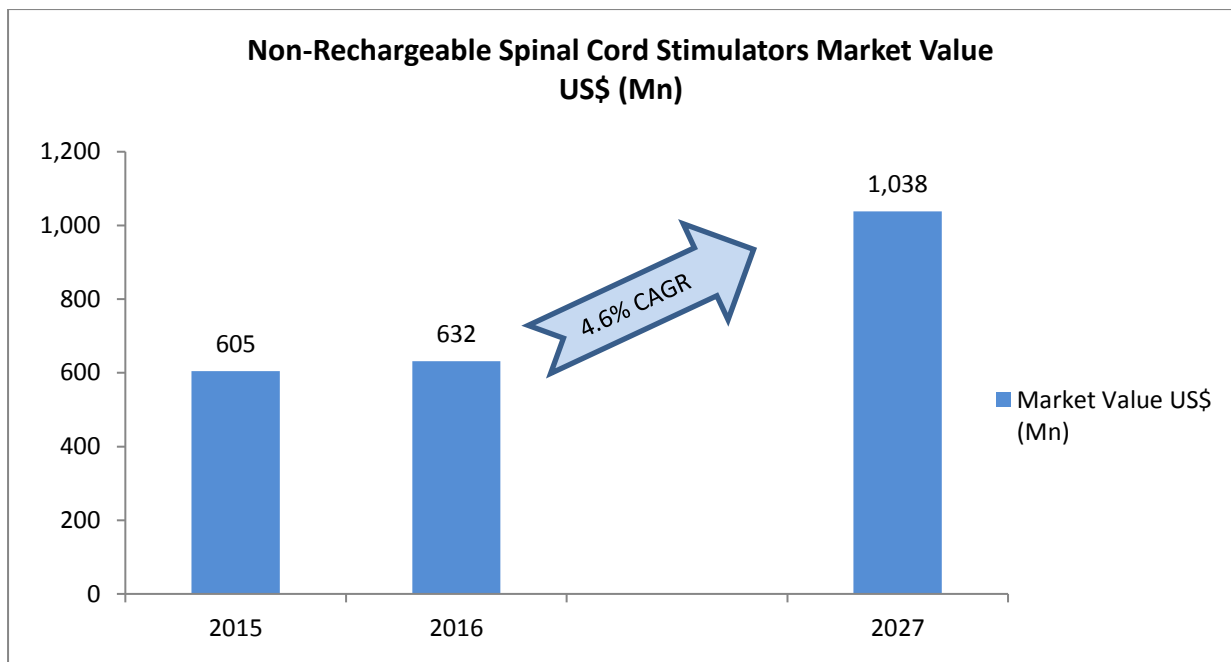


Figure 5 Non-Rechargeable Spinal Cord Stimulators Market Value US\$ Mn (2015-2027)

Market Attractiveness

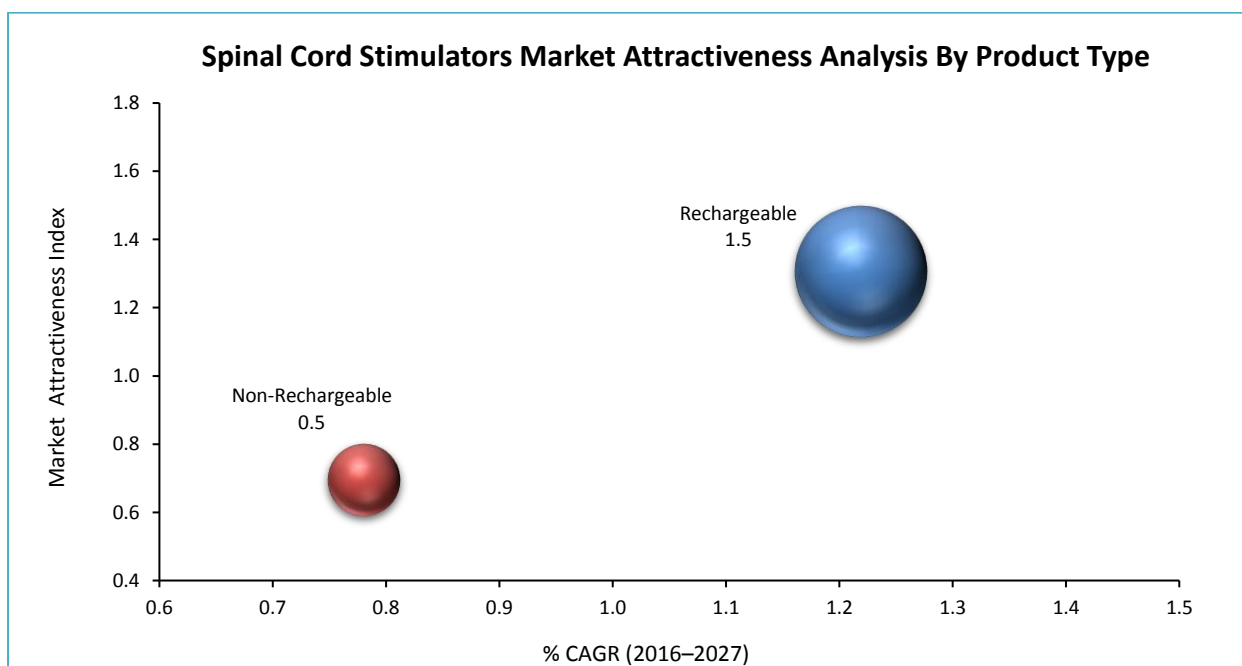


Figure 6 Spinal Cord Stimulators Market Attractiveness Analysis by Product Type

Fig 6 shows that market attractiveness of rechargeable spinal cord stimulators market is more than the non-rechargeable spinal cord stimulators. Market attractiveness of rechargeable devices is 1.5 as compared to 0.5 market attractiveness of non-rechargeable SCS devices.

7.1.2 Global Spinal Cord Stimulators Market Value (US\$ Mn) By Application

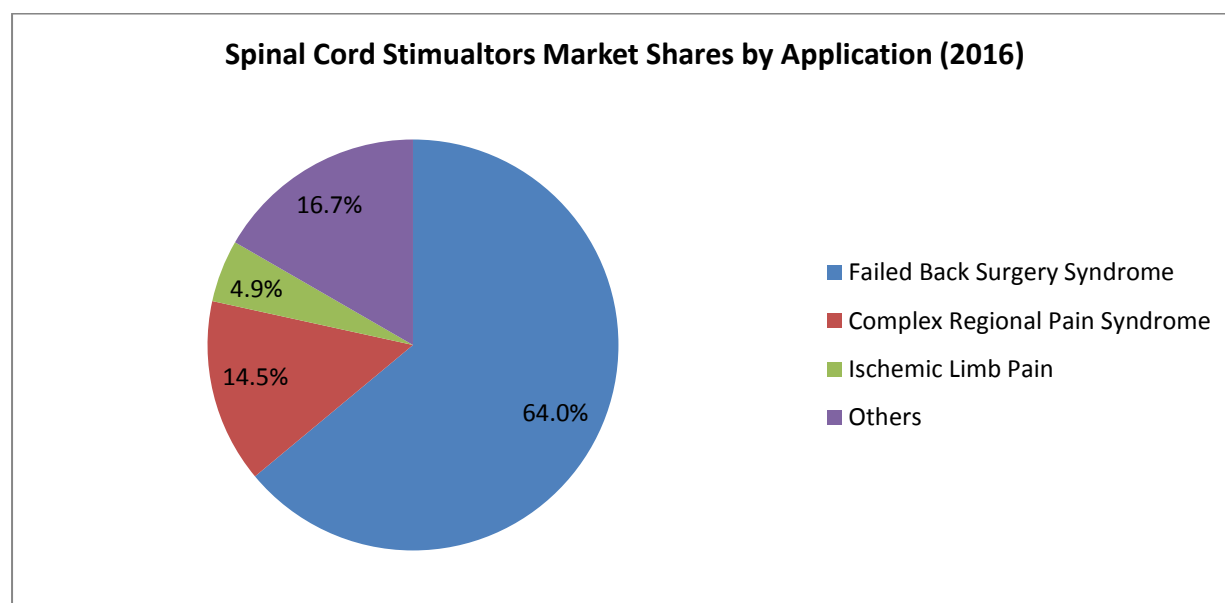


Figure 7 Spinal Cord Stimulators Market Share by Application (2016)

Fig 7 shows that Failed Back Surgery Syndrome (FBBS) is leading cause for use of spinal cord stimulators followed by Complex Regional Pain Syndrome (CRPS). Other application also comprises 16.7% of total market. Higher failure rate of spine surgeries (to manage the chronic pain) and severity associated with failure of spine surgery is the cause due to which FBBS comprises majority of market share which is 64%.

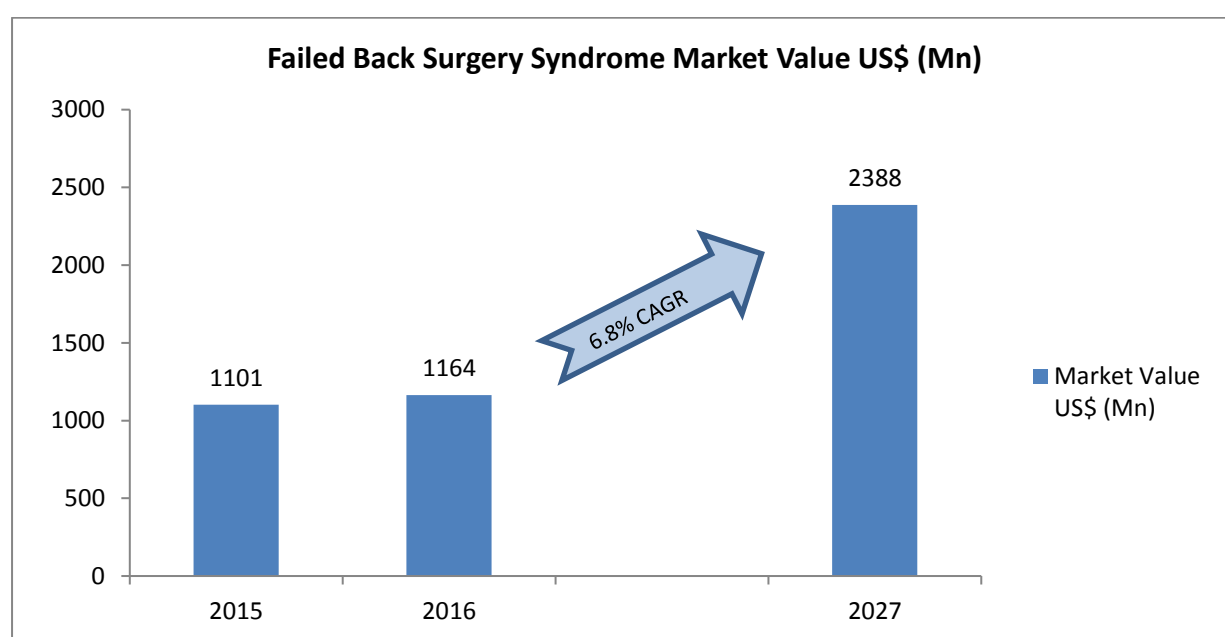


Figure 8 Failed Back Surgery Syndrome Market Value US\$ Mn (2015-2027)

Fig 8 shows that market of spinal cord stimulators for the treatment of failed back surgery syndrome will grow at a CAGR of 6.8% over the forecast period and grow to the value of US\$ 2388 Mn by 2027. While current market for the spinal cord stimulators in treatment of FBSS is US\$ 1164 Mn.

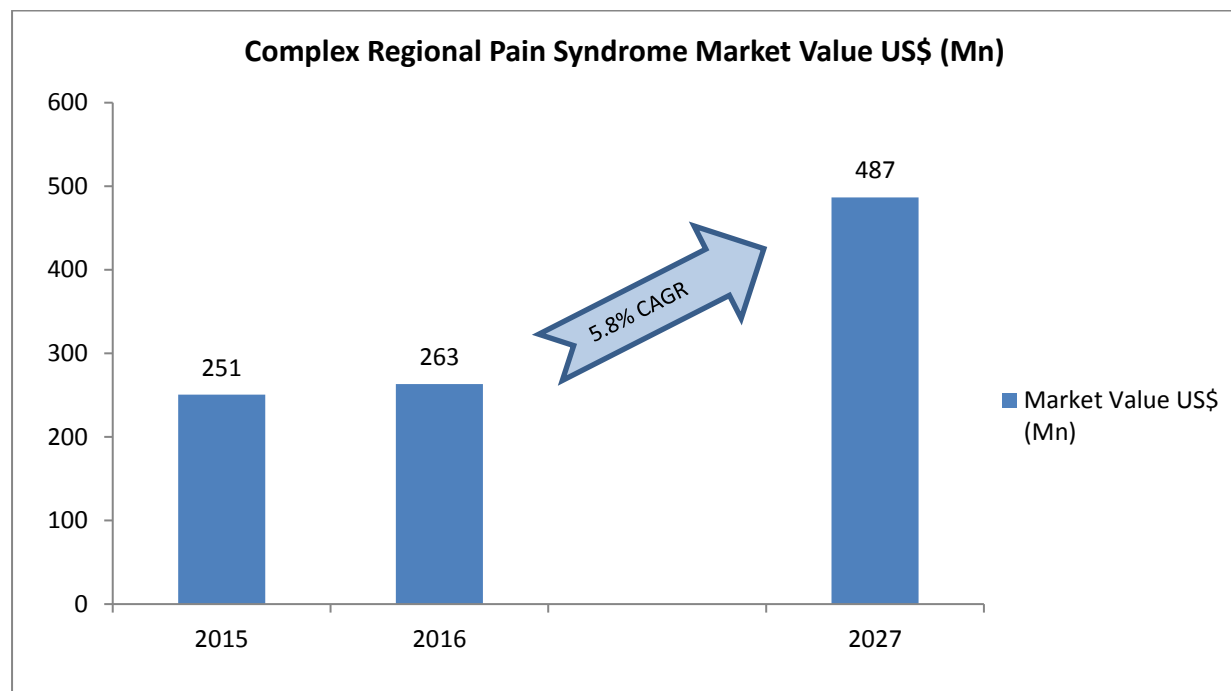


Figure 9 Complex Regional Pain Syndrome Market Value US\$ Mn (2015-2027)

Fig 9 shows that market of spinal cord stimulators for the treatment of complex regional pain syndrome will grow at a CAGR of 5.8% over the forecast period and expected to grow to the value of US\$ 487 Mn by 2027. While in 2016 market for the spinal cord stimulators in treatment of CRPS was US\$ 263 Mn.

Fig 10 shows that market of spinal cord stimulators for the treatment of ischemic limb pain will grow at a CAGR of 4.9% over the forecast period and expected to grow to the value of US\$ 151 Mn by 2027. While in 2016 market of the spinal cord stimulators in treatment of ischemic limb pain was US\$ 89 Mn.

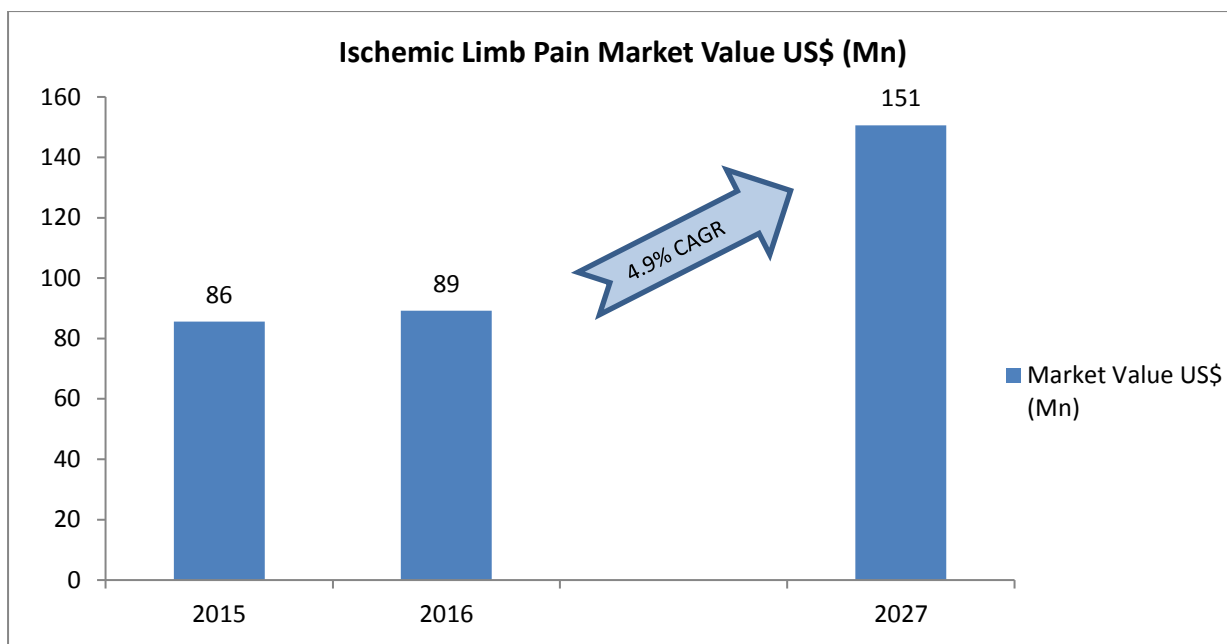


Figure 10 Ischemic Limb Pain Market Value US\$ Mn (2015-2017)

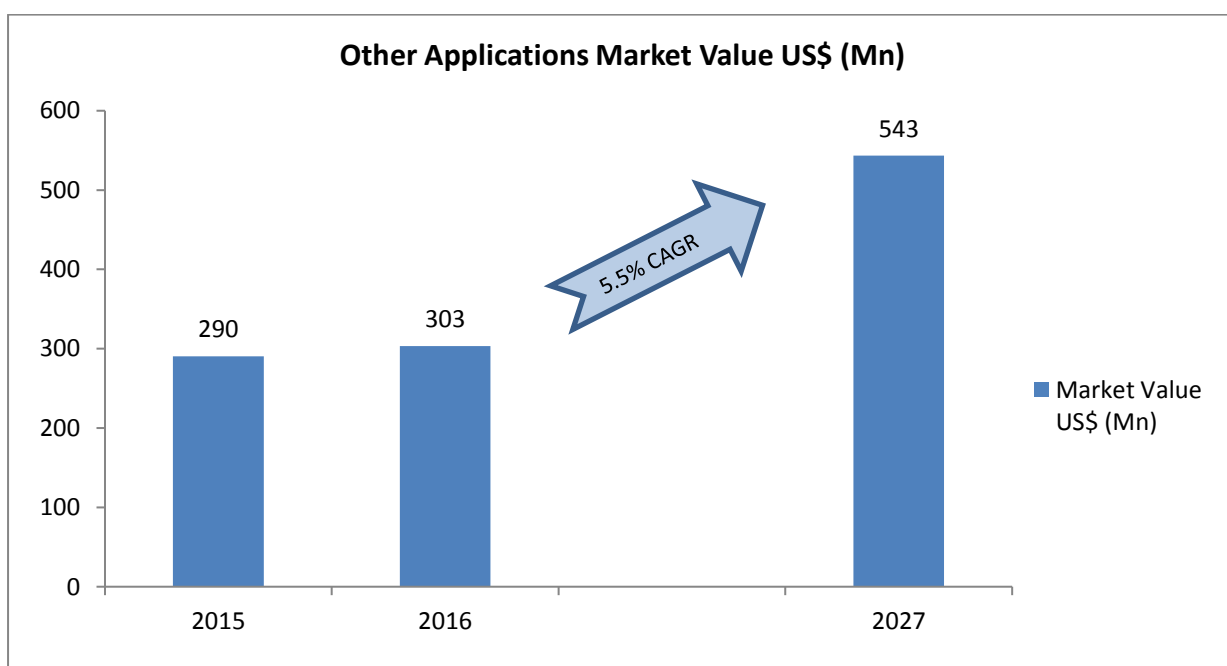


Figure 11 Other Applications Market Value US\$ Mn (2015-2027)

Fig 10 shows that market of spinal cord stimulators for the treatment of other chronic pain conditions such as, Arachnoiditis, Degenerative Disk Disease, Peripheral Vascular Disease, Multiple Sclerosis and Spinal Cord Injury will grow at a CAGR of 5.5% over the forecast period and expected to grow to the value of US\$ 543 Mn by 2027. While in 2016 market of the spinal cord stimulators in treatment of others was US\$ 303 Mn.

Market Attractiveness

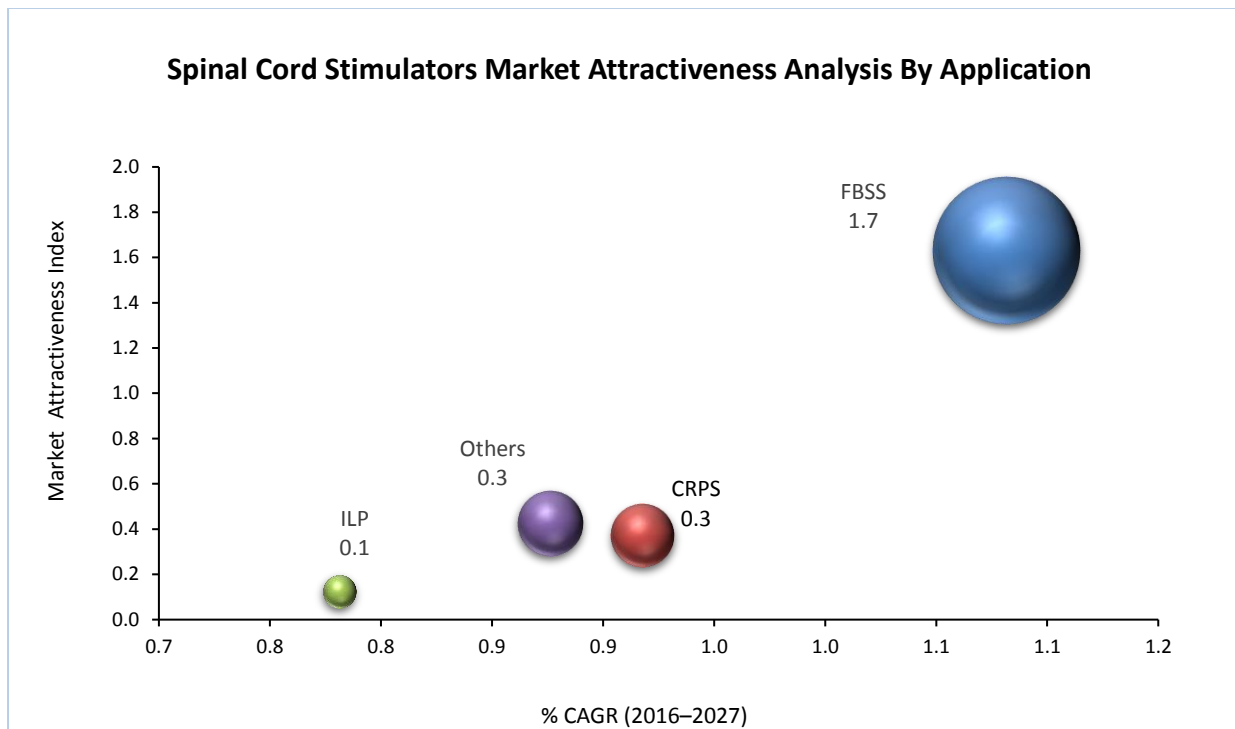


Figure 12 Spinal Cord Stimulators Market Attractiveness Analysis by Application

Fig 12 shows that Failed Back Surgery Syndrome treatment market is most attractive market with attractive index of 1.7. Complex Regional Pain Syndrome has market attractiveness index of 0.3. Ischemic Limb Pain has attractiveness index of 0.1 and other application area such as, Arachnoiditis, Degenerative Disk Disease, Peripheral Vascular Disease, Multiple Sclerosis and Spinal Cord Injury has index of 0.3 collectively.

7.1.3 Global Spinal Cord Stimulators Market Value (US\$ Mn) By Region

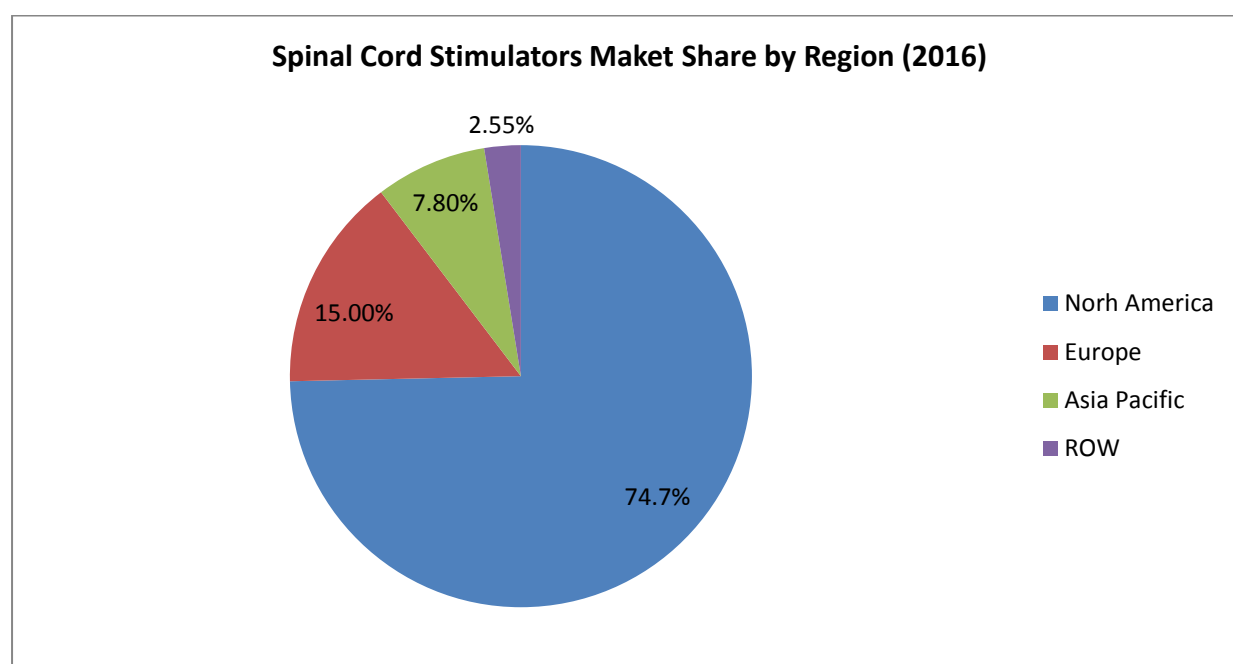


Figure 13 Spinal Cord Stimulators Market Share by Region (2016)

Fig 13 shows that North America most dominating region in the global spinal cord stimulators market followed by Europe. North America comprises 74.7% of the global spinal cord stimulators market. Europe comprises 15% market share and Asia-Pacific market comprises 7.80% market share. Rest of the World (ROW) comprises only 2.55% of global market. North America region has countries USA and Canada. USA has better reimbursement policies and this country is the major focus of the all the companies. Better reimbursement policies and government focus to reduce chronic pain economic burden is reason for the growth in this region.

Fig 14 shows that North America region is expected to show a CAGR higher than the global average CAGR. North America market is expected to grow at a CAGR of 6.6% to reach a value of US\$ 2713 Mn by 2027. North America spinal cord stimulators market in 2016 was US\$ 1359 Mn.

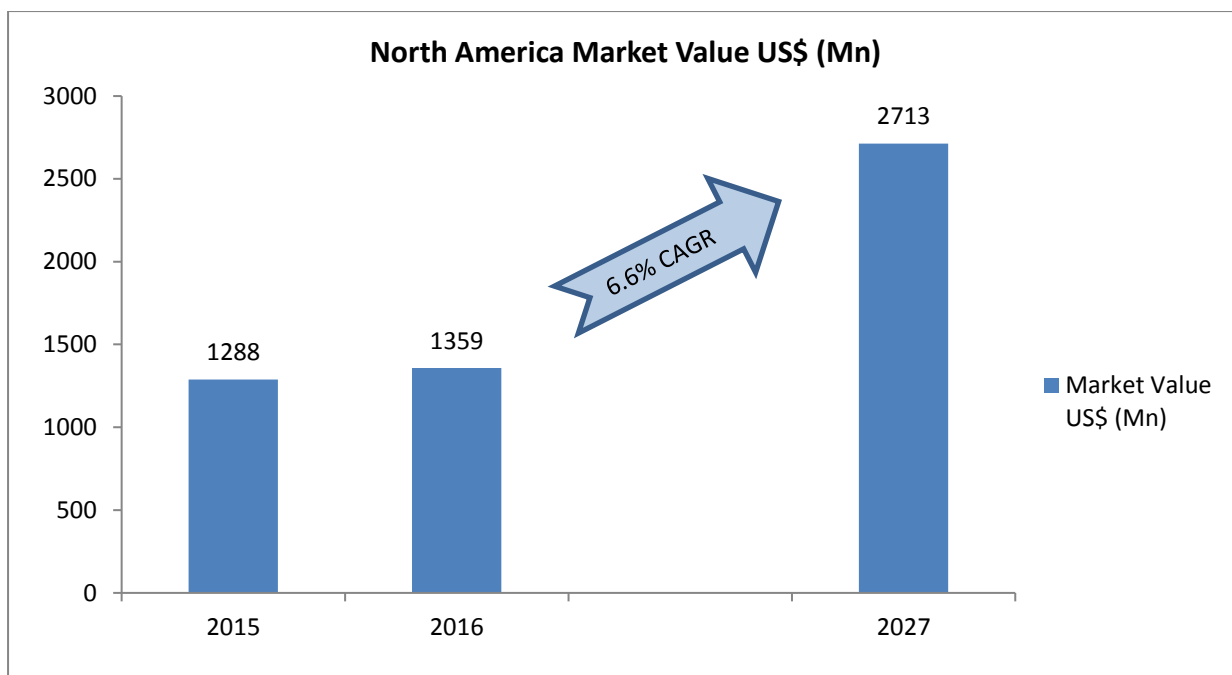


Figure 14 North America Spinal Cord Stimulators Market Value US\$ Mn (2015-2027)

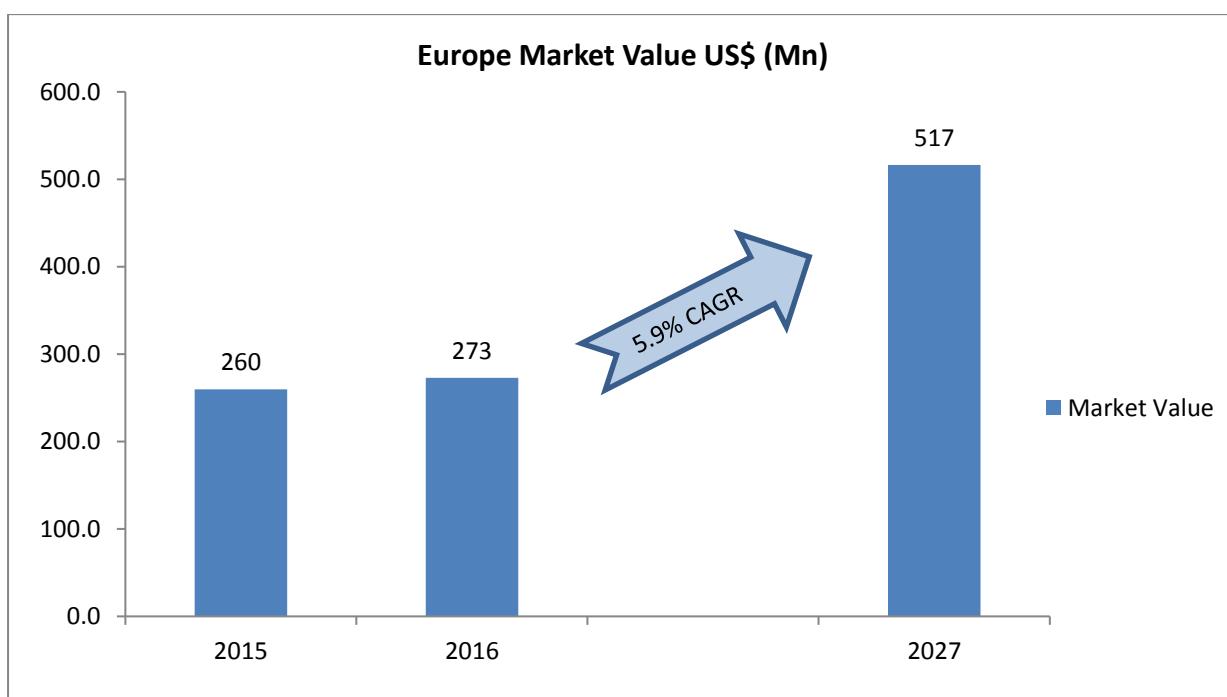


Figure 15 Europe Spinal Cord Stimulators Market Value US\$ Mn (2015-2027)

Fig 15 shows that Europe spinal cord stimulators market is expected to grow at a CAGR lower than global average CAGR. Europe market is expected to grow at a CAGR of 5.9%

during the forecast period and reach a value of US\$ 517 Mn. Actual Europe spinal cord stimulators market was US\$ 273 Mn in 2016.

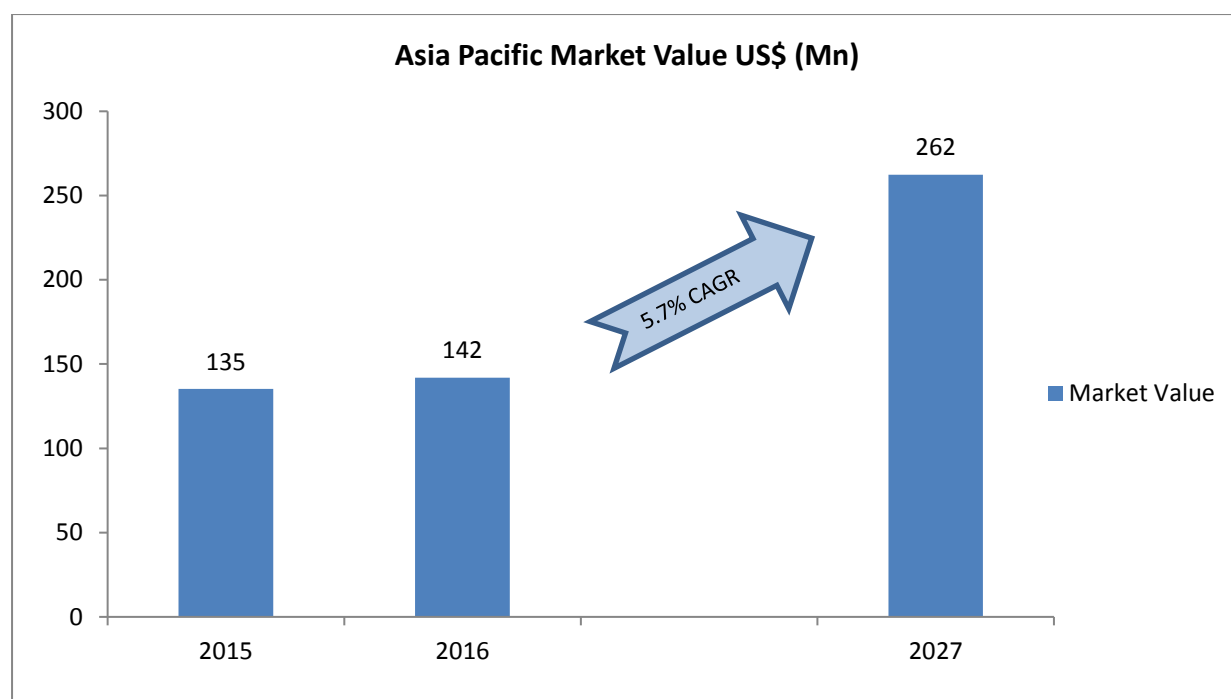


Figure 16 Asia Pacific Spinal Cord Stimulators Market Value US\$ Mn (2015-2027)

Fig 16 shows Asia Pacific region spinal cord stimulators market which is expected to grow at a CAGR of 5.7% over the forecast period. Asia Pacific market will grow from US\$ 142 Mn market value in 2016 to US\$ 262 Mn in 2027. Asia Pacific region comprises China, India, Japan, Australia, New Zealand, ASEAN etc.

Fig 17 shows the market value and forecast for the Rest of the World which include regions such as Latin America, Middle East and Africa. These regions bring the least revenue for the spinal cord stimulators. Market in this region is expected to grow at a CAGR of 4.5% over the forecast period which is less than global average CAGR of 6.4%. ROW spinal cord stimulators market is expected to grow from US\$ 46 Mn in 2016 to US\$ 76 Mn by 2027.

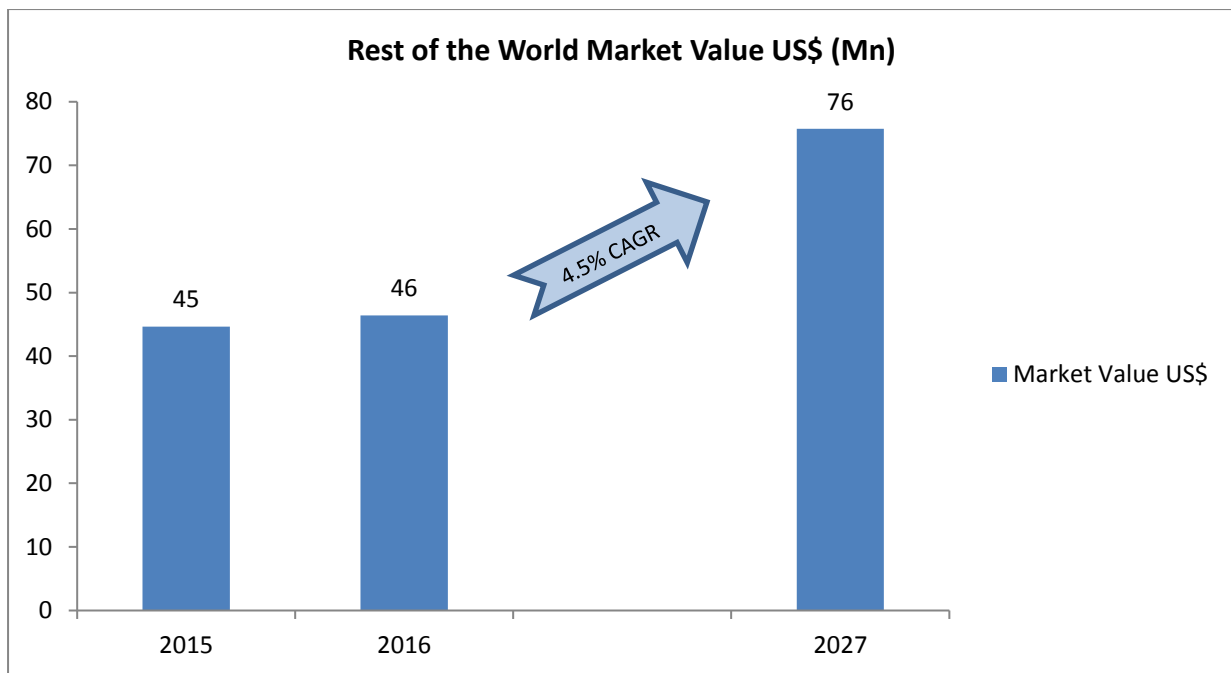


Figure 17 ROW Spinal Cord Stimulators Market Value US\$ Mn (2015-2017)

Market Attractiveness

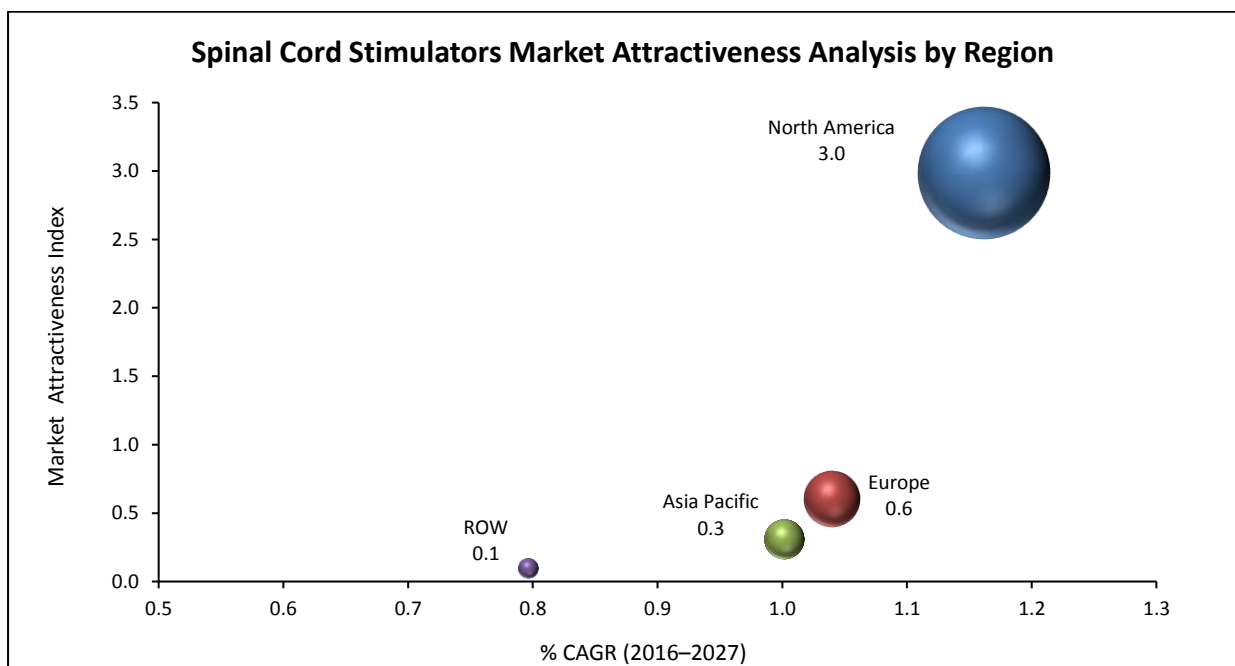


Figure 18 Spinal Cord Stimulators Market Attractiveness Analysis by Region

Fig 18 shows that North America is most attractive market for spinal cord stimulators with an attractiveness index of 3.0 followed by Europe having market attractiveness index of 0.6. Asia Pacific region has attractiveness index of 0.3 and ROW has 0.1 attractiveness index.

7.2 North America Spinal Cord Stimulators Market

Overall North America market is expected to grow at a CAGR of 6.6%. USA and Canada countries were included in this region

7.2.1 North America Spinal Cord Stimulators Market by Product Type

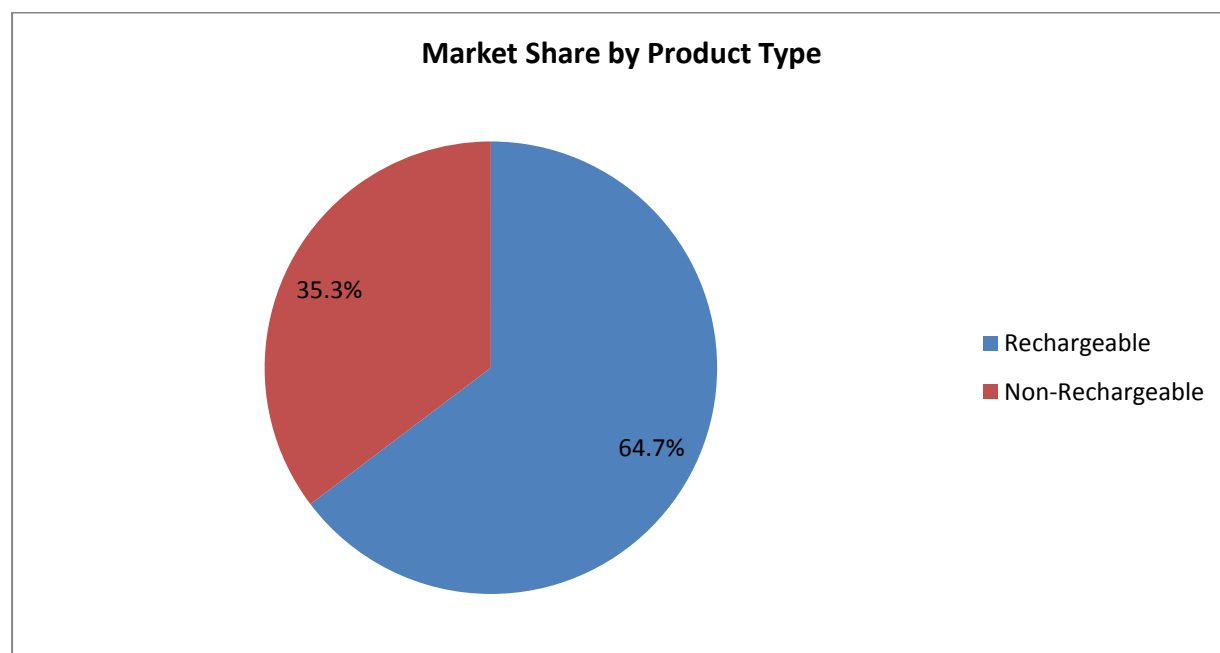


Figure 19 North America Market Share by Product Type

Fig 19 shows the market shares of both the product types in the North America region. Rechargeable spinal cord stimulators dominate the market in the North America region with 64.6% share. Non-Rechargeable has market share of 35.3%.

Fig 20 shows that Rechargeable spinal cord stimulators market is expected to grow at a CAGR higher than the average CAGR of North America region. Rechargeable SCS market is expected to grow at a CAGR of 7.5% to reach a value of US\$ 1924 Mn by 2027. Actual market was US\$ 879 Mn in 2016.

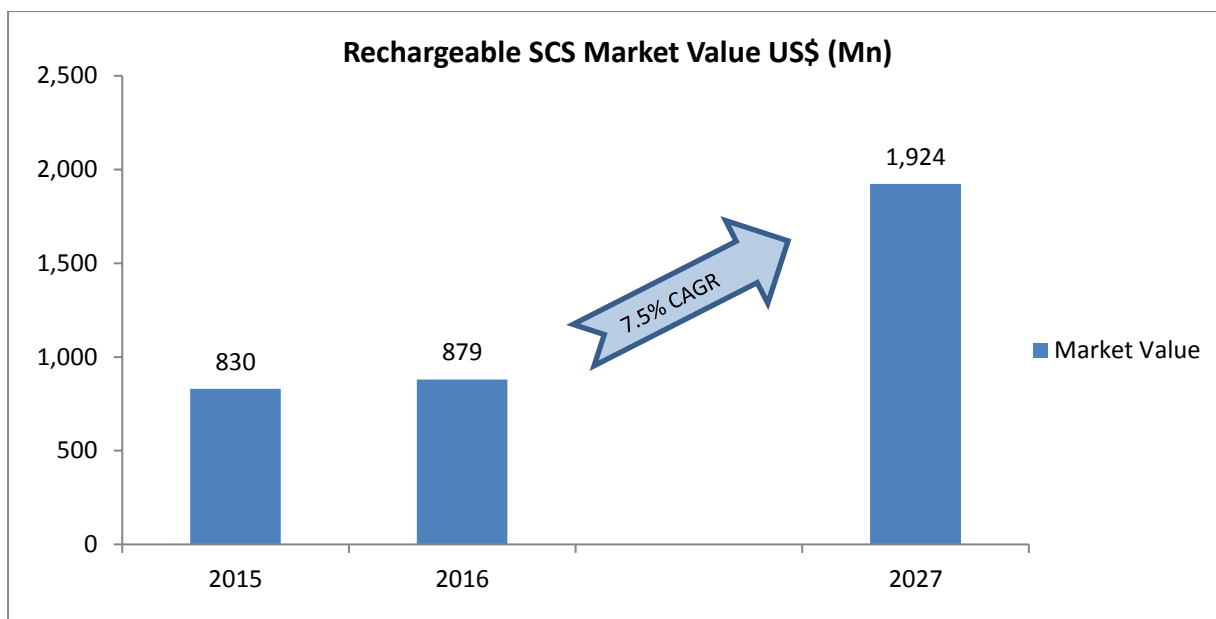


Figure 20 Rechargeable Spinal Cord Stimulators Market Value US\$ Mn in North America

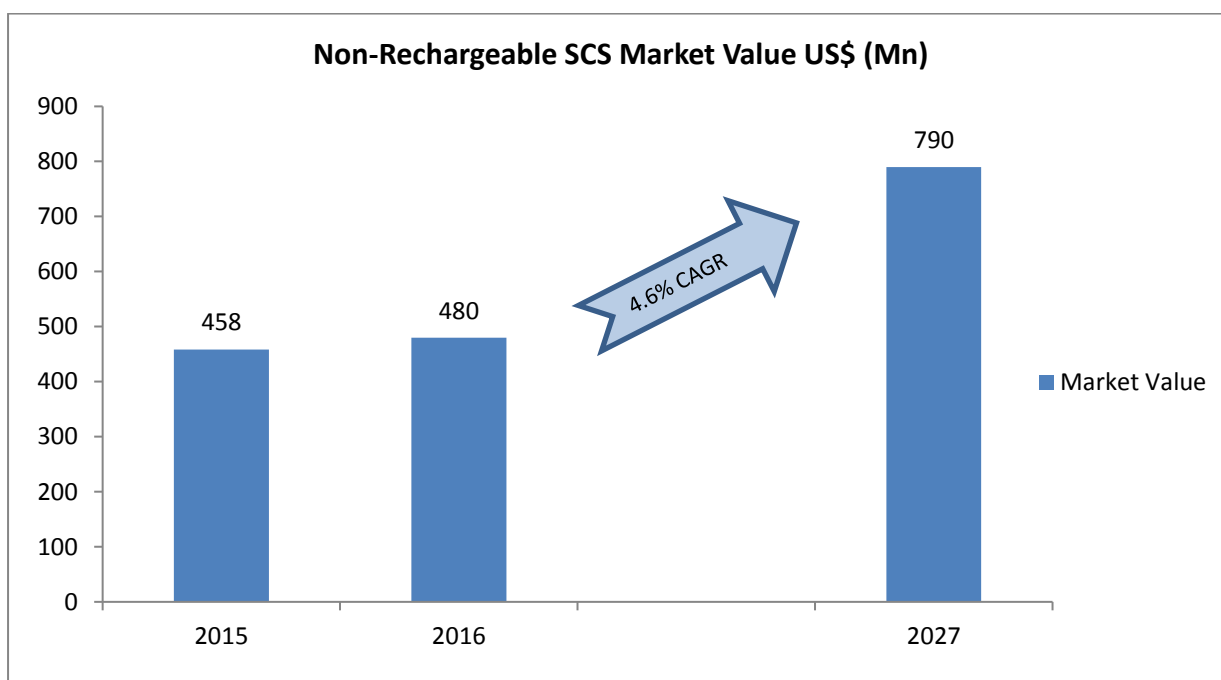


Figure 21 Non-Rechargeable Spinal Cord Stimulators Market Value US\$ Mn in North America

Fig 21 shows that Non-Rechargeable spinal cord stimulators market is expected to grow at a CAGR lower than the average CAGR of North America region. Non-Rechargeable SCS market is expected to grow at a CAGR of 4.6% to reach a value of US\$ 790 Mn by 2027. Actual market was US\$ 480 Mn in 2016.

7.2.2 North America Spinal Cord Stimulators Market by Application Area

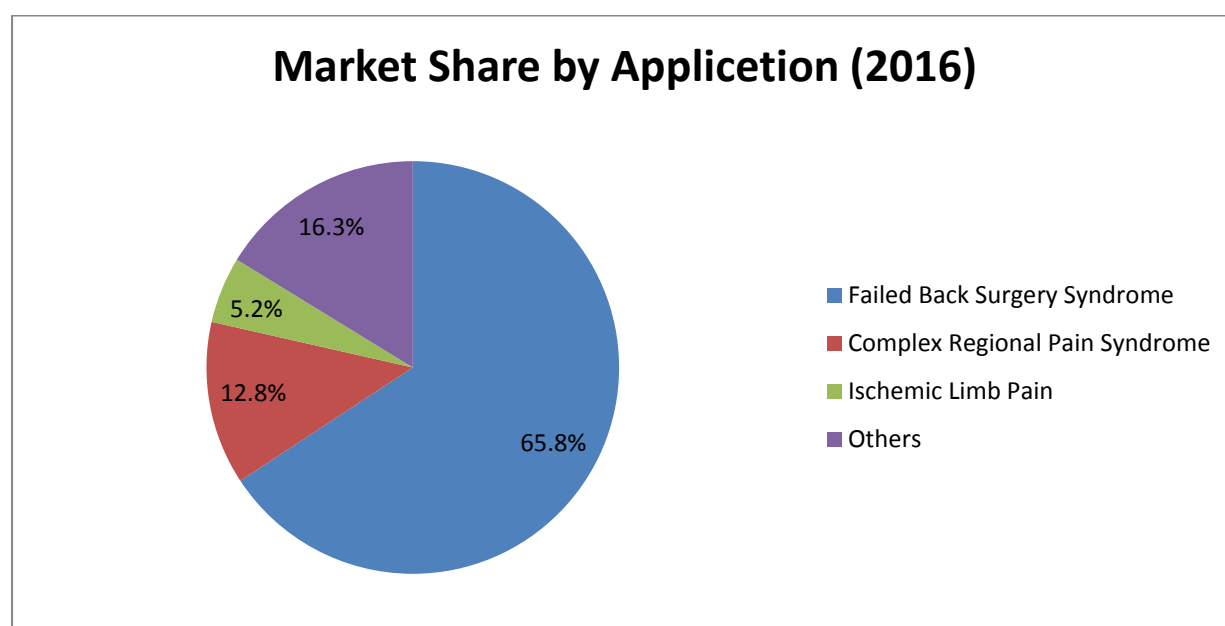


Figure 22 North America Spinal Cord Stimulators Market Share by Application (2016)

Fig 22 shows that Failed Back Surgery Syndrome (FBBS) is leading cause for use of spinal cord stimulators followed by Complex Regional Pain Syndrome (CRPS). FBBS accounts for 65.8% market share and CRPS has 12.8% market share. Ischemic Limb Pain accounts for 5.2% and other application areas accounts for 16.3% shares.

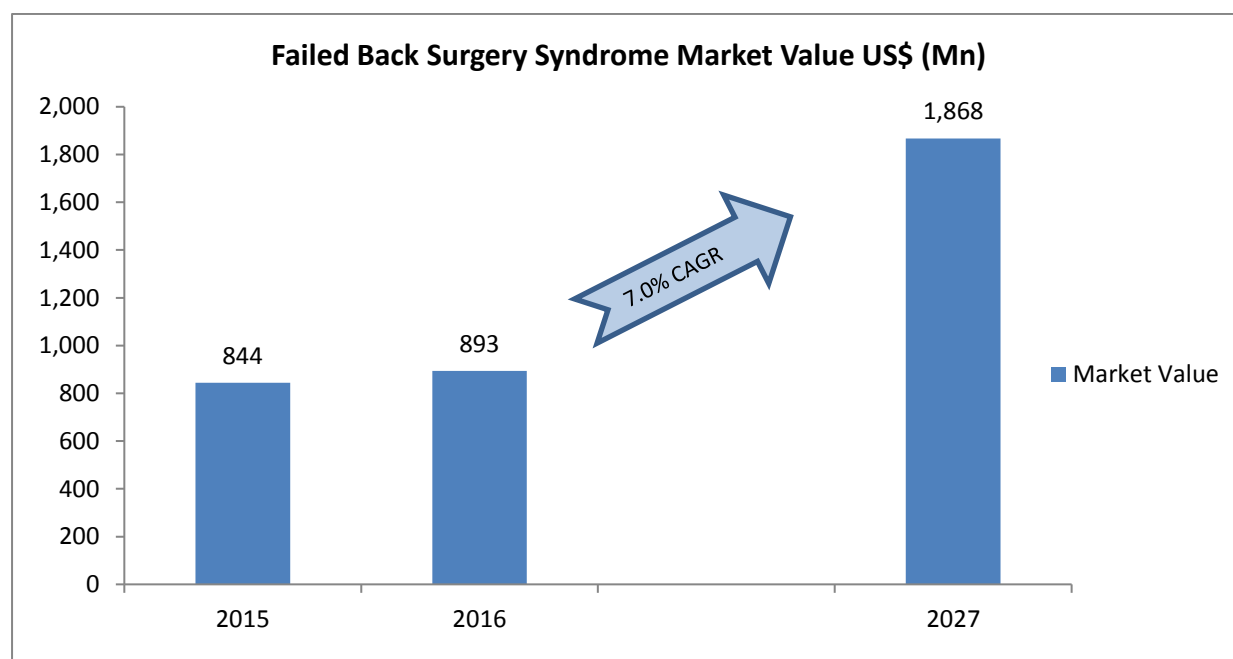


Figure 23 Failed Back Surgery Syndrome Market Value US\$ Mn in North America

Fig 23 shows that failed back surgery syndrome is expected to grow at a CAGR of 7.0% over the forecast period which is higher than the average North America region. FBBS market is expected to reach the value of US\$ 1868 Mn by 2027 from the US\$ 893 Mn in 2016.

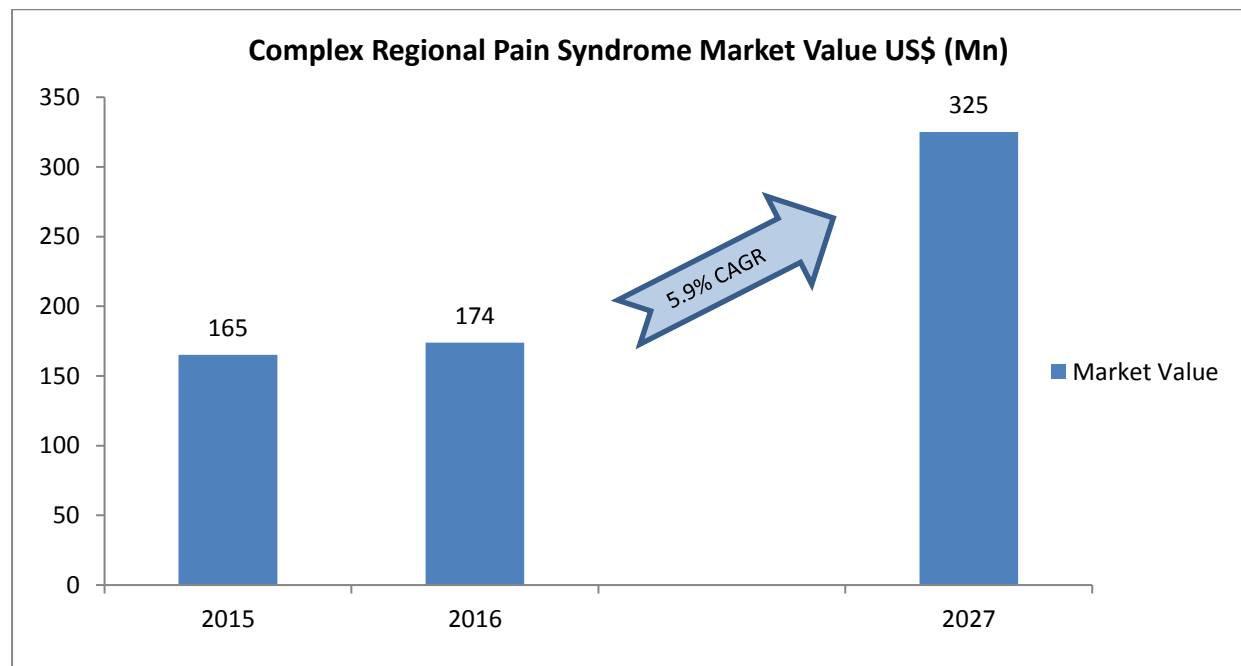


Figure 24 Complex Regional Pain Syndrome Market Value US\$ Mn in North America

Fig 24 shows that complex regional pain syndrome market is expected to grow at a CAGR of 5.9% over the forecast period which is lower than the average North America region. CRPS market is expected to reach the value of US\$ 325 Mn by 2027 from the US\$ 174 Mn in 2016.

Fig 25 shows that Ischemic Limb Pain market is expected to grow at a CAGR of 5.0% over the forecast period which is lower than the average North America region. Ischemic Limb Pain market is expected to reach the value of US\$ 121 Mn by 2027 from the US\$ 71 Mn in 2016.

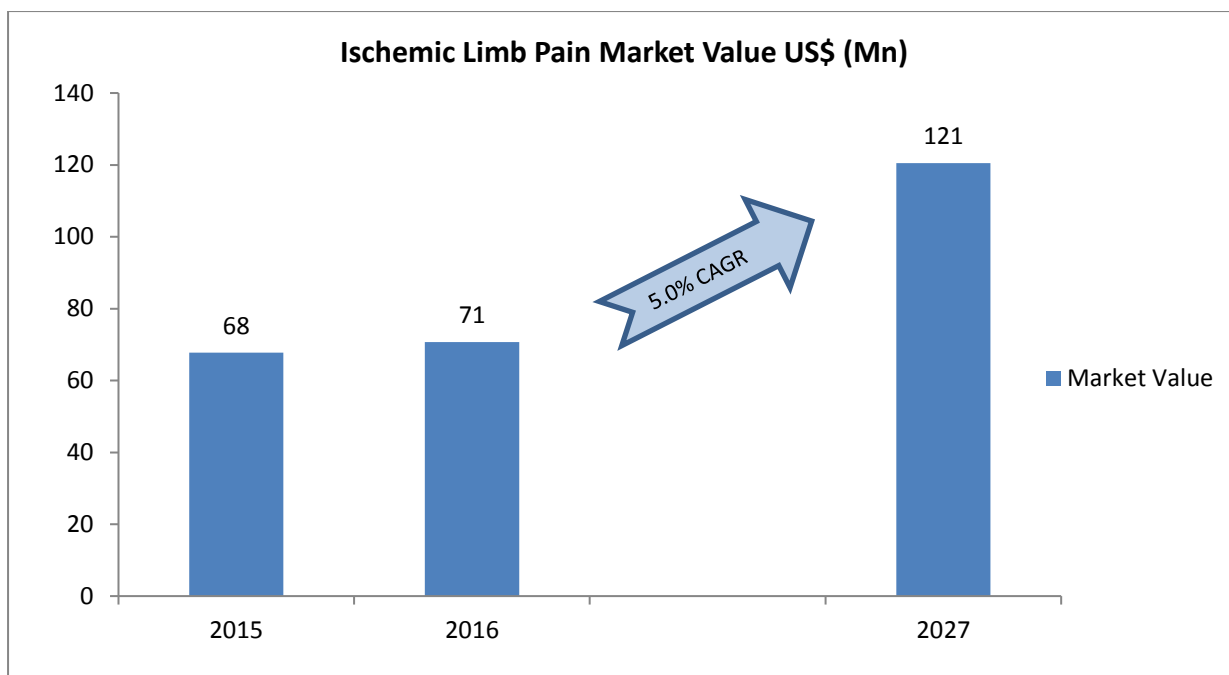


Figure 25 Ischemic Limb Pain Market Value US\$ Mn in North America

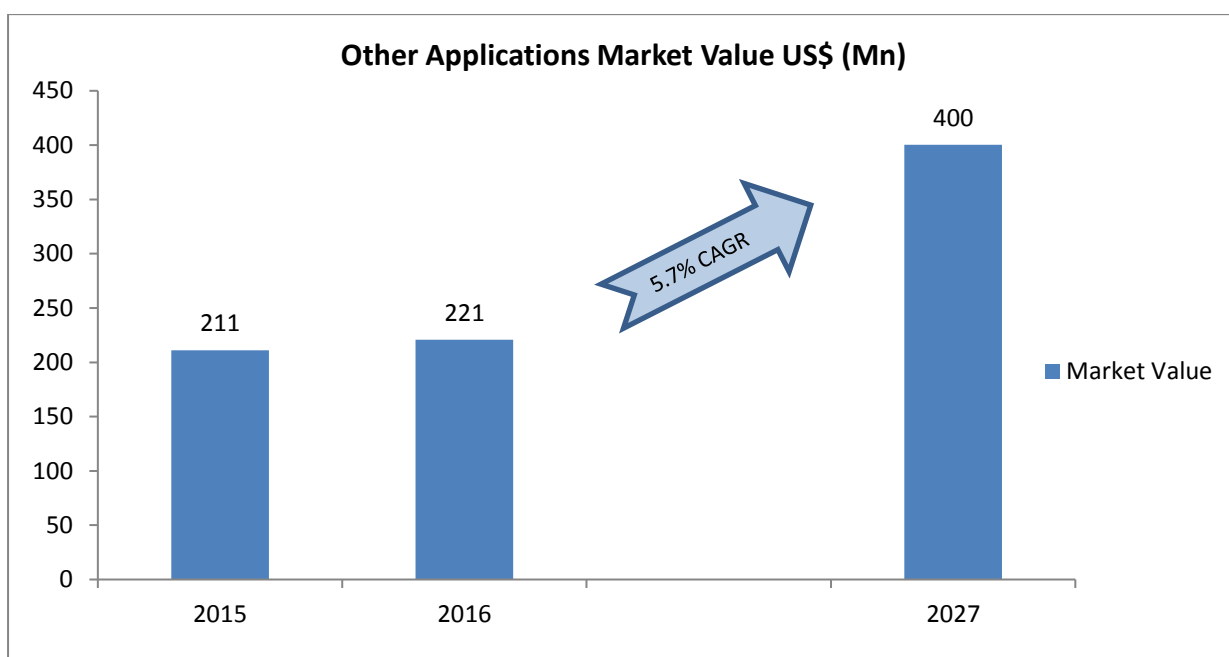


Figure 26 Other Application Market Value US\$ Mn in North America

Fig 26 shows that market of spinal cord stimulators for the treatment of other chronic pain conditions such as, Arachnoiditis, Degenerative Disk Disease, Peripheral Vascular Disease, Multiple Sclerosis and Spinal Cord Injury will grow at a CAGR of 5.7% over the forecast

period and expected to grow to the value of US\$ 400 Mn by 2027. While in 2016 market of the spinal cord stimulators in treatment of others was US\$ 221 Mn.

Market Attractiveness

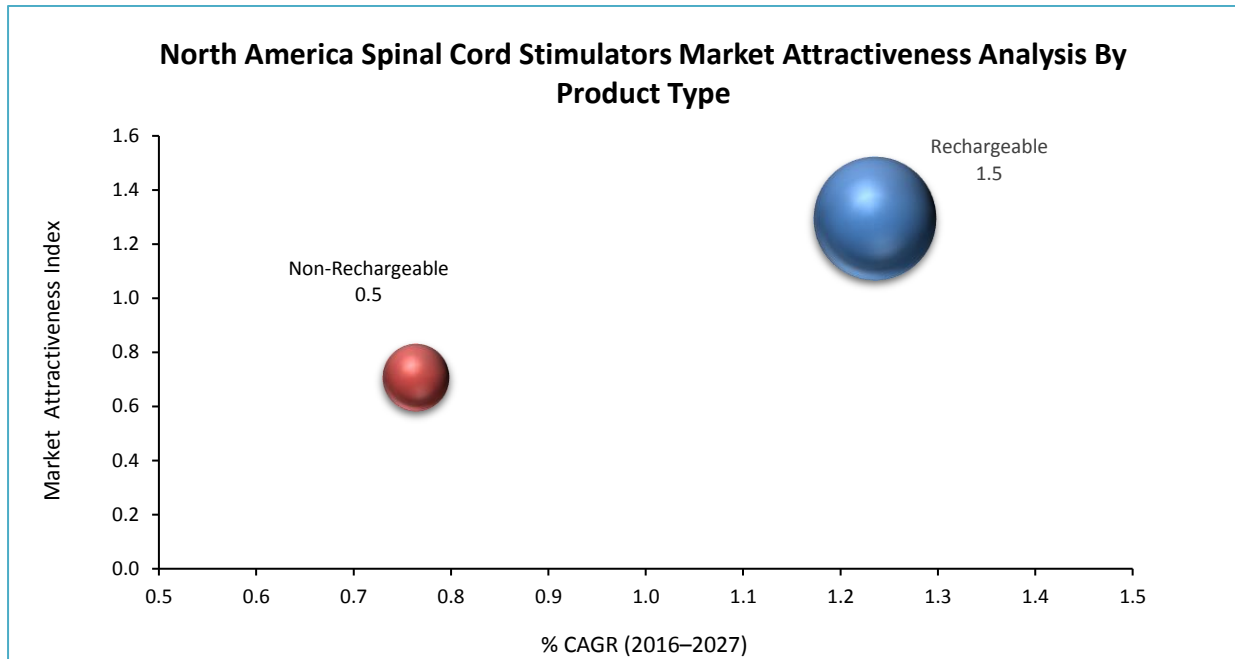


Figure 27 North America Spinal Cord Stimulators Market Attractiveness Analysis by Product Type

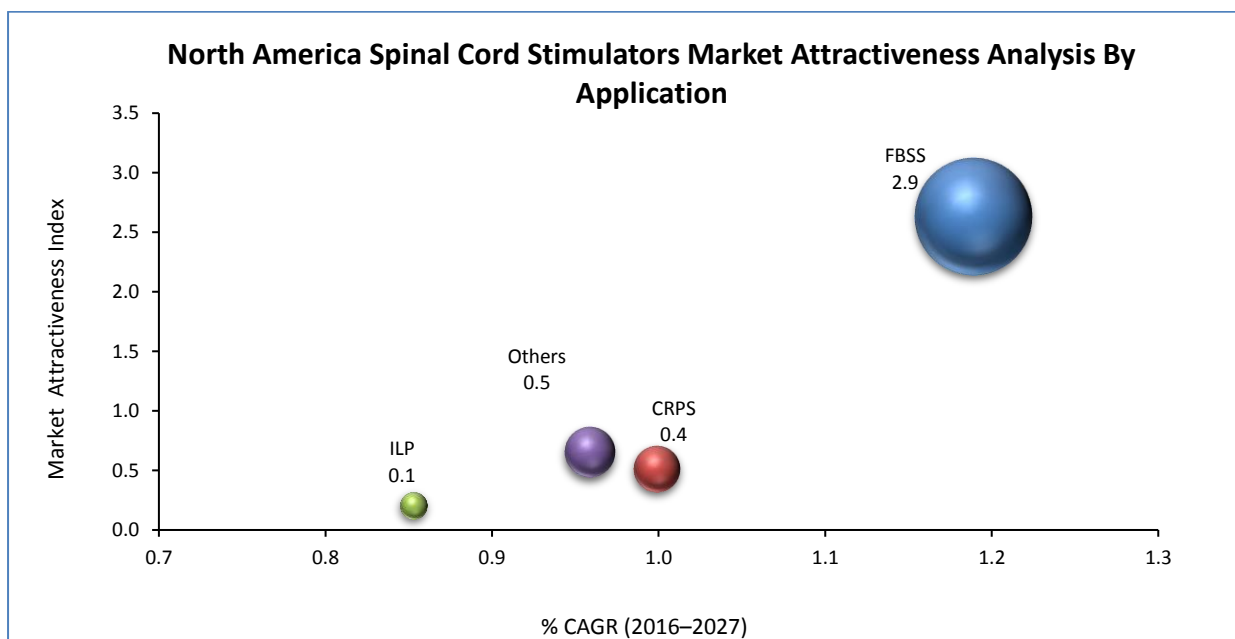


Figure 28 North America Spinal Cord Stimulators Market Attractiveness Analysis by Application Area

Fig 27 shows that Rechargeable spinal cord stimulators segment is the most attractive segment in the North America Market. Market attractiveness index of rechargeable spinal cord stimulators is 1.5. Non-Rechargeable spinal cord stimulators has market attractiveness index of 0.5.

Fig 28 shows that failed back surgery syndrome segment has highest market attractiveness index in the North America market followed by complex regional pain syndrome. FBBS has market attractiveness index of 2.9 and CRPS has attractiveness index of 0.4. Ischemic limb pain has attractiveness index of 0.1 and other applications has attractiveness index of 0.5.

7.3 Europe Spinal Cord Stimulators Market

Overall Europe market is expected to grow at a CAGR of 5.9%. Major spinal cord stimulators markets in Europe region are Germany, France, UK, Italy, Spain, Poland, Russia etc.

7.3.1 Europe Spinal Cord Stimulators Market by Product Type

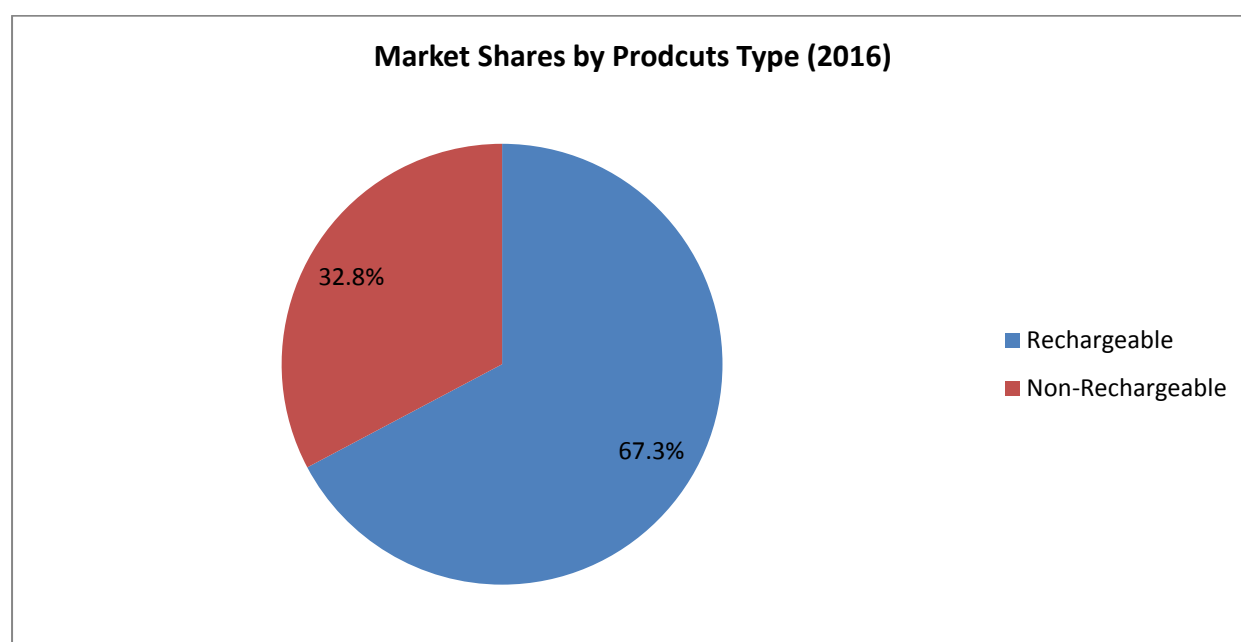


Figure 29 Europe Market Shares by Product Type (2016)

Fig 29 shows the market shares of both the product types in the Europe region. Rechargeable spinal cord stimulators dominate the market in the Europe region with 67.3% share. Non-Rechargeable has market share of 32.8%.

Fig 30 shows that Rechargeable spinal cord stimulators market is expected to grow at a CAGR higher than the average CAGR of Europe region. Rechargeable SCS market is expected to grow at a CAGR of 6.5% to reach a value of US\$ 372 Mn by 2027. Actual market was US\$ 184 Mn in 2016.

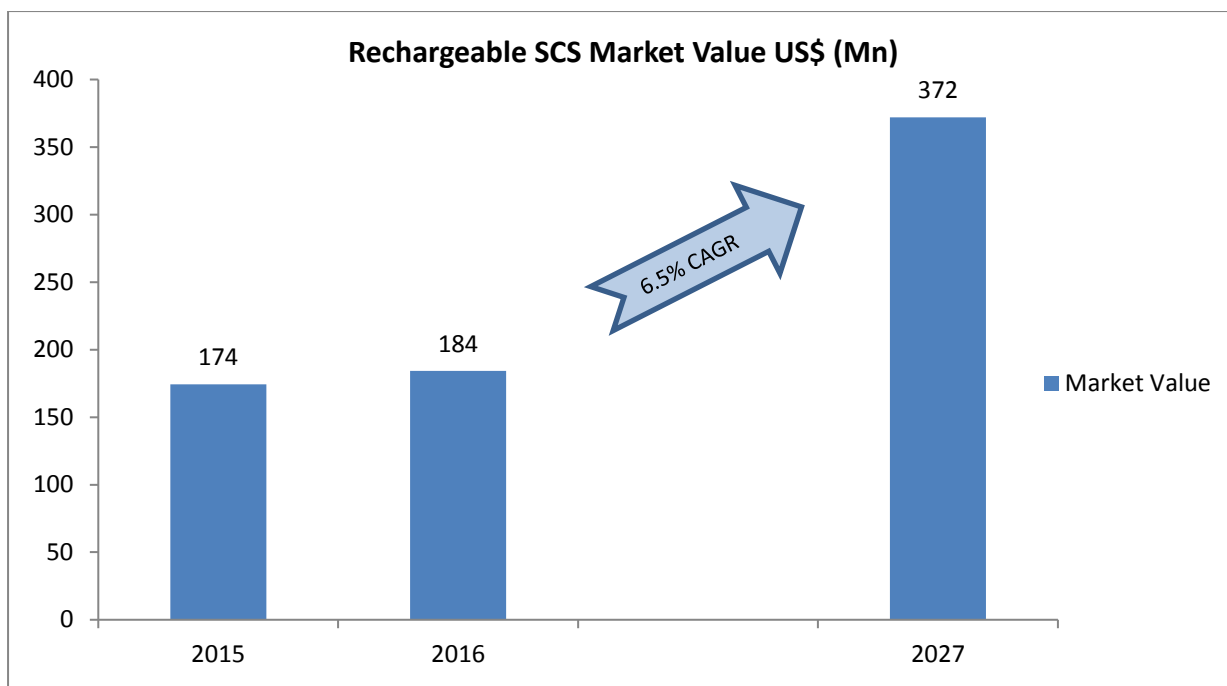


Figure 30 Rechargeable Spinal Cord Stimulators Market Value US\$ Mn in Europe

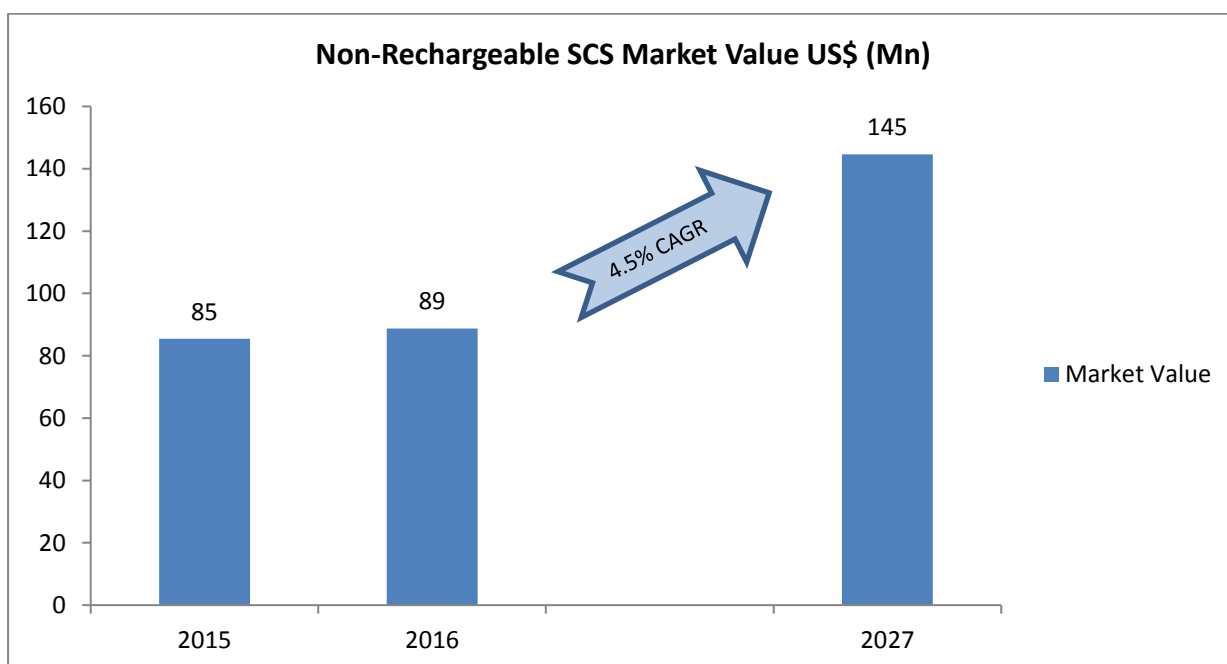


Figure 31 Non-Rechargeable Spinal Cord Stimulators Market Value US\$ Mn in Europe

Fig 31 shows that Non-Rechargeable spinal cord stimulators market is expected to grow at a CAGR lower than the average CAGR of Europe region. Non-Rechargeable SCS market is expected to grow at a CAGR of 4.5% to reach a value of US\$ 145 Mn by 2027. Actual market was US\$ 89 Mn in 2016.

7.3.2 Europe Spinal Cord Stimulators Market by Application

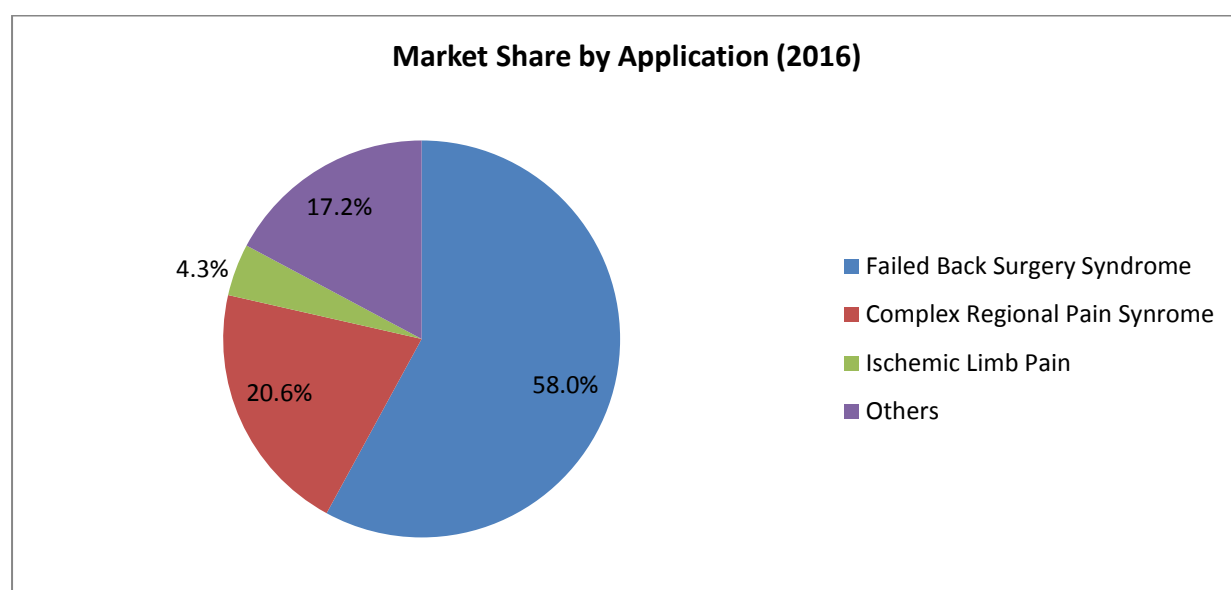


Figure 32 Europe Spinal Cord Stimulators Market Share by Application (2016)

Fig 32 shows that Failed Back Surgery Syndrome (FBBS) is leading cause for use of spinal cord stimulators followed by Complex Regional Pain Syndrome (CRPS). FBBS accounts for 58% market share and CRPS has 20.6% market share. Ischemic Limb Pain accounts for 4.3% and other application areas accounts for 17.2% shares.

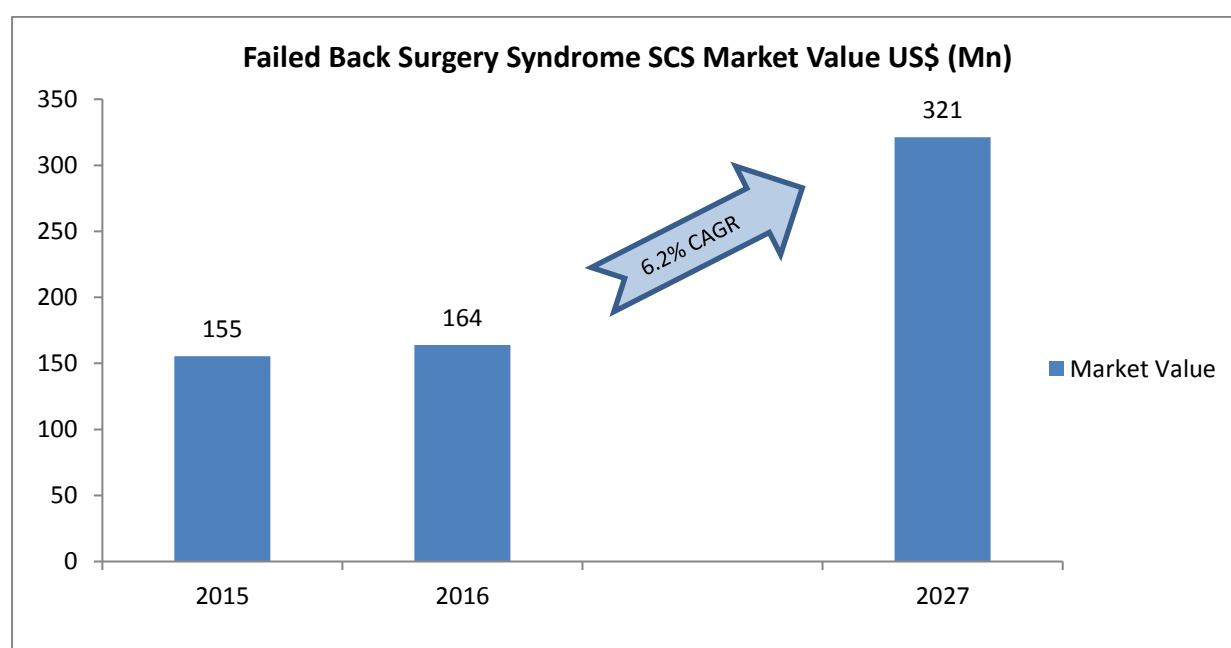


Figure 33 Failed Back Surgery Syndrome Market Value US\$ Mn in Europe

Fig 33 shows that failed back surgery syndrome is expected to grow at a CAGR of 6.2% over the forecast period which is higher than the average CAGR of Europe. FBBS market is expected to reach the value of US\$ 321 Mn by 2027 from the US\$ 164 Mn in 2016.

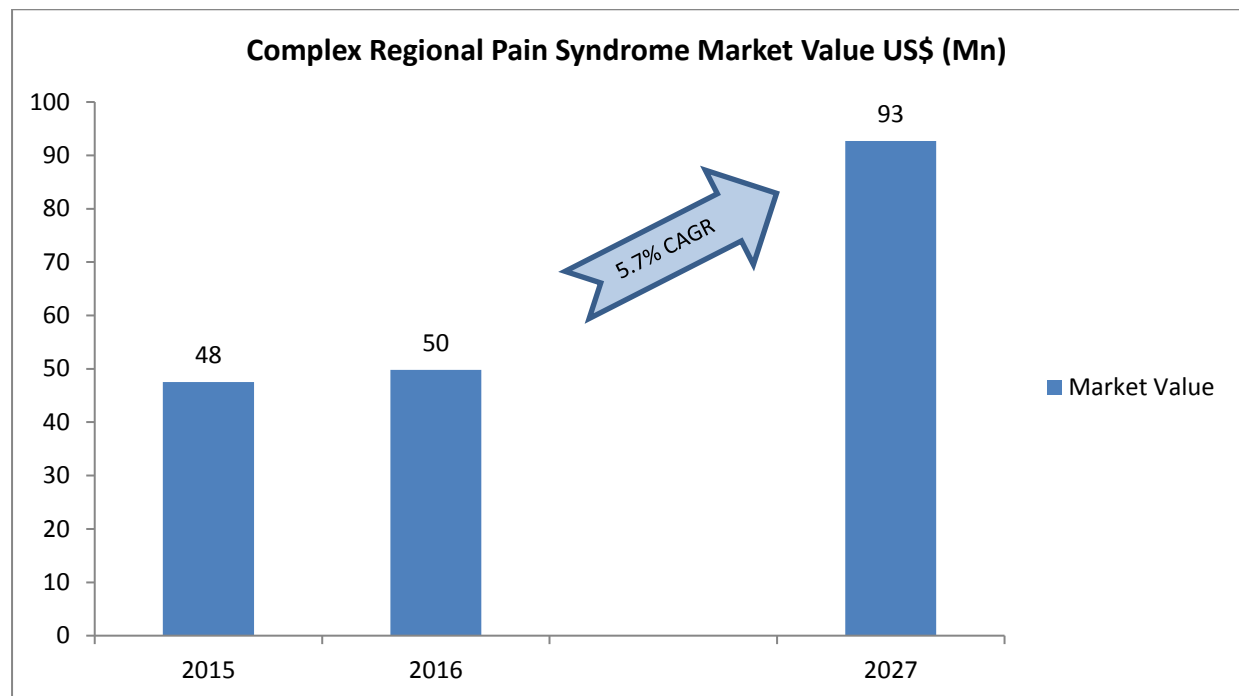


Figure 34 Complex Regional Pain Syndrome Market Value US\$ Mn in Europe

Fig 34 shows that complex regional pain syndrome market is expected to grow at a CAGR of 5.7% over the forecast period which is lower than the average CAGR of Europe region. CRPS market is expected to reach the value of US\$ 93 Mn by 2027 from the US\$ 50 Mn in 2016.

Fig 35 shows that Ischemic Limb Pain market is expected to grow at a CAGR of 4.4% over the forecast period which is lower than the average CAGR of Europe Region. Ischemic Limb Pain market is expected to reach the value of US\$ 19.9 Mn by 2027 from the US\$ 12.3 Mn in 2016.

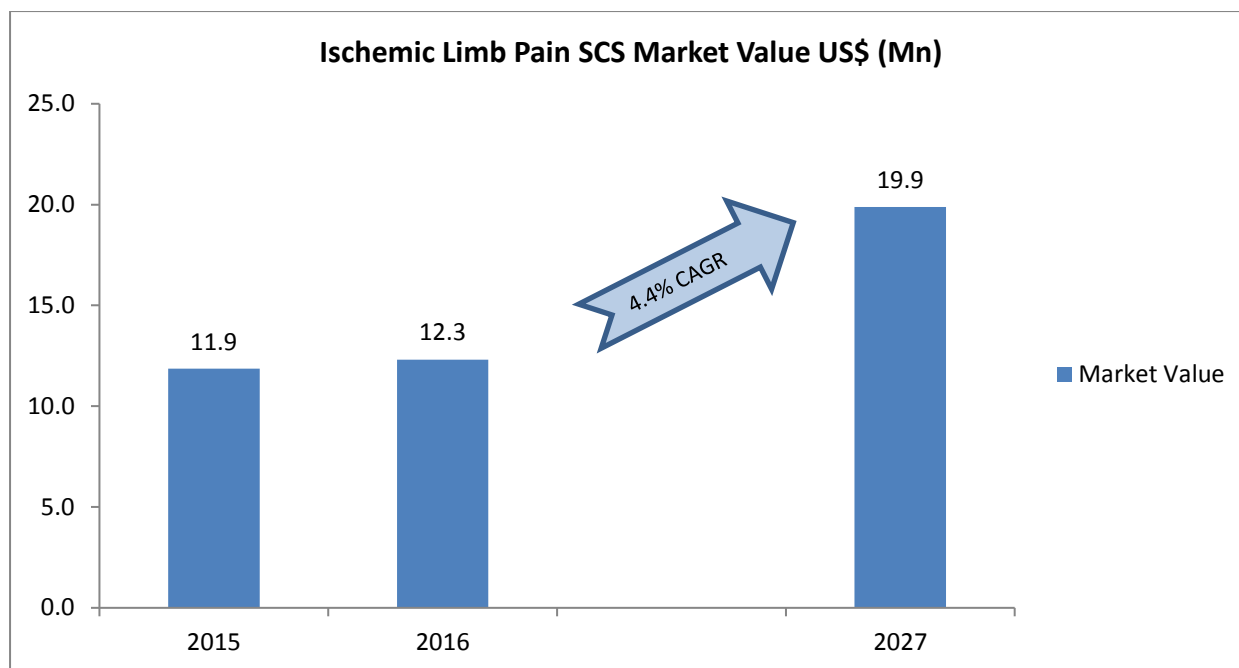


Figure 35 Ischemic Limb Pain Market Value US\$ Mn in Europe

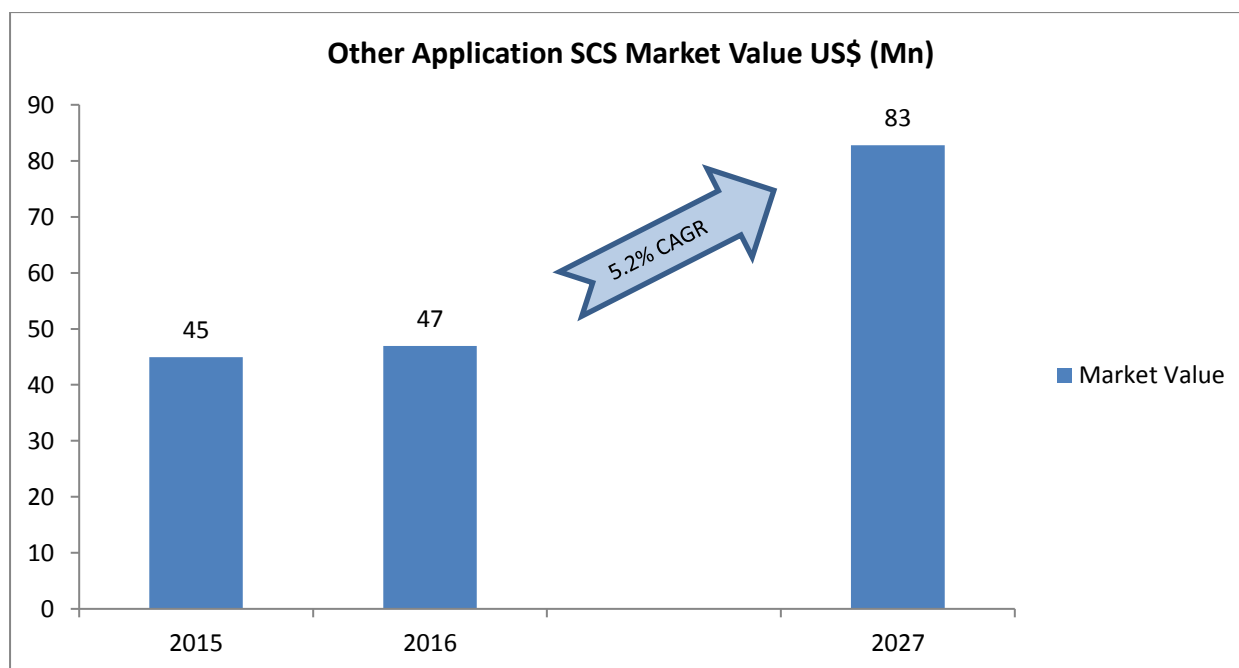


Figure 36 Other Application Market Value US\$ Mn in Europe

Fig 36 shows that market of spinal cord stimulators for the treatment of other chronic pain conditions such as, Arachnoiditis, Degenerative Disk Disease, Peripheral Vascular Disease, Multiple Sclerosis and Spinal Cord Injury will grow at a CAGR of 5.2% over the forecast

period and expected to grow to the value of US\$ 83 Mn by 2027. While in 2016 market of the spinal cord stimulators in treatment of others was US\$ 47 Mn.

Market Attractiveness

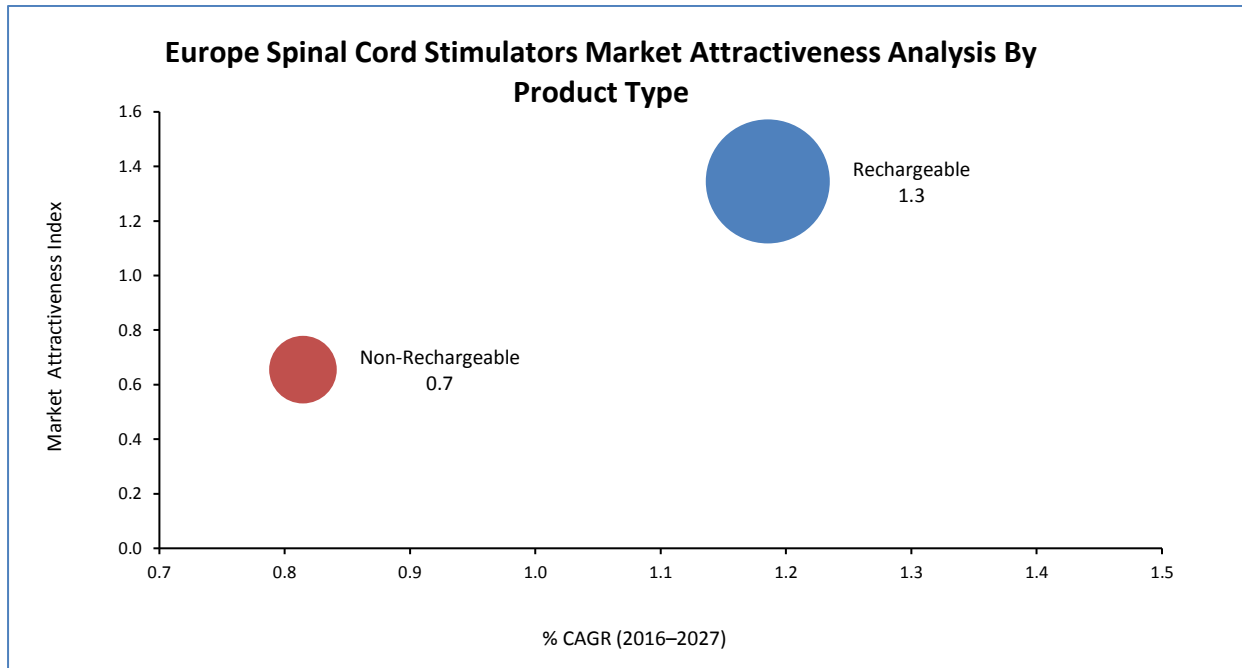


Figure 37 Europe Spinal Cord Stimulators Market Attractiveness Analysis by Product Type

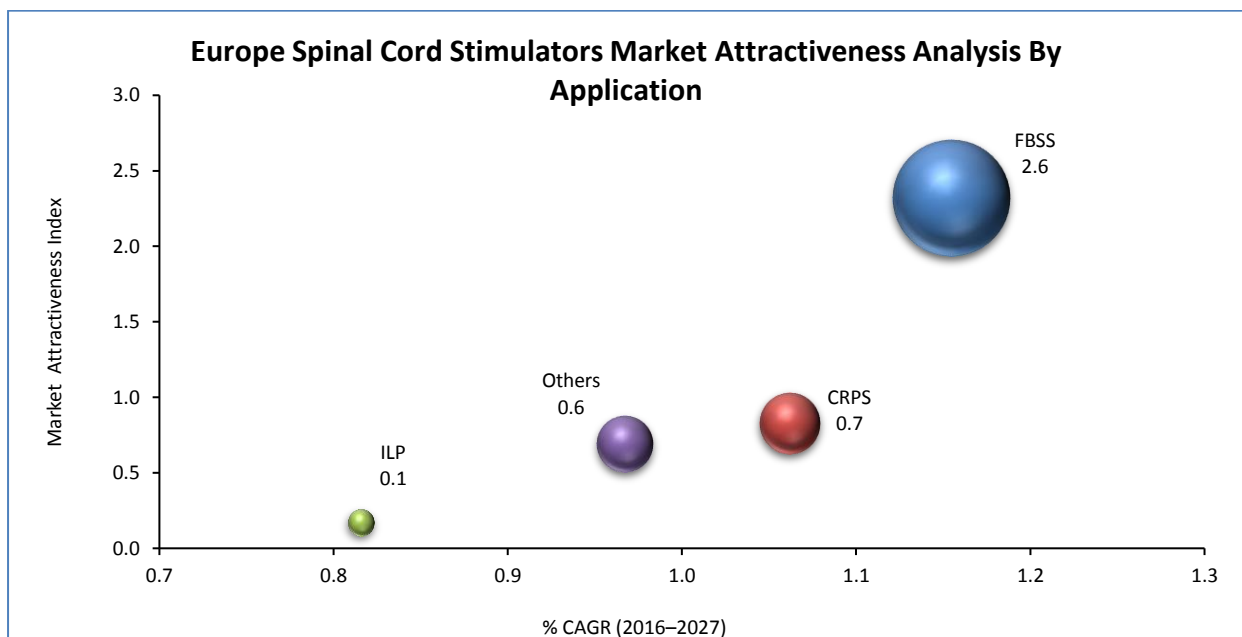


Figure 38 Europe Spinal Cord Stimulators Market Attractiveness Analysis by Application Area

Fig 37 shows that Rechargeable spinal cord stimulators segment is the most attractive segment in the Europe Market. Market attractiveness index of rechargeable spinal cord stimulators is 1.3. Non-Rechargeable spinal cord stimulators has market attractiveness index of 0.7.

Fig 38 shows that failed back surgery syndrome segment has highest market attractiveness index in the Europe market followed by complex regional pain syndrome. FBBS has market attractiveness index of 2.6 and CRPS has attractiveness index of 0.7. Ischemic limb pain has attractiveness index of 0.1 and other applications has attractiveness index of 0.6.

7.4 Asia Pacific Spinal Cord Stimulators Market

Overall Asia Pacific market is expected to grow at a CAGR of 5.7%. Major countries included in Asia Pacific region are Japan, China, India, ASEAN Countries, Australia, New Zealand etc.

7.4.1 Asia Pacific SCS Market by Product Type

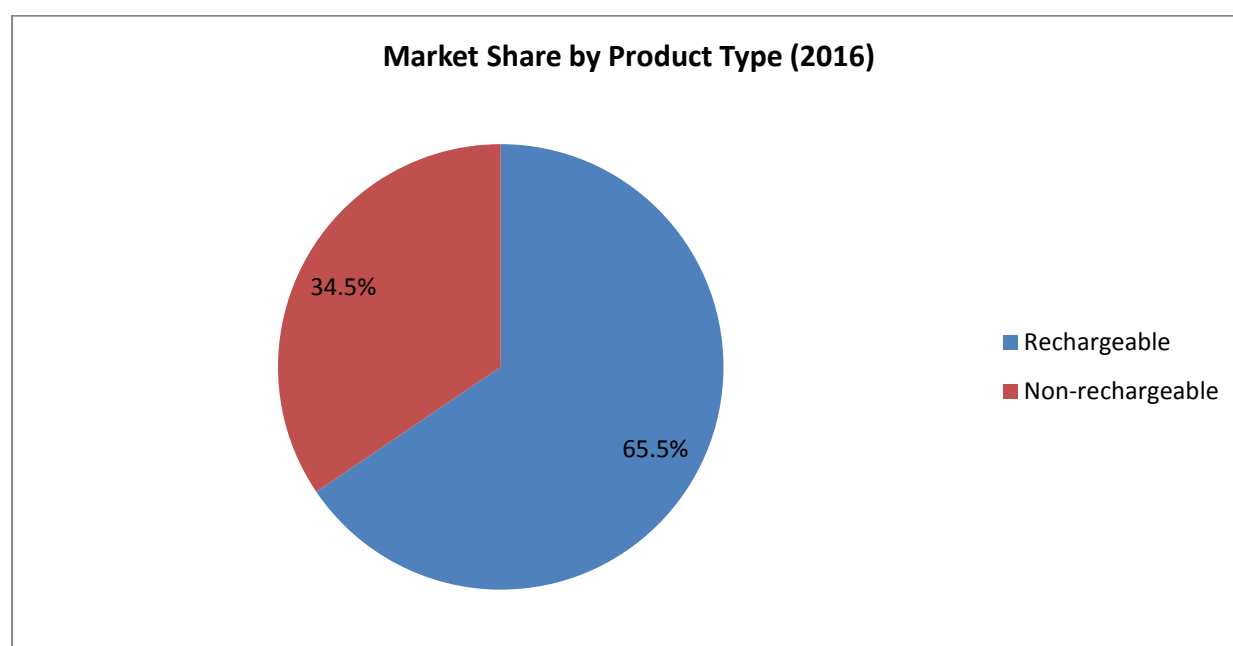


Figure 39 Asia Pacific Market Share by Product Type (2016)

Fig 39 shows the market shares of both of the product types in the Asia Pacific region. Rechargeable spinal cord stimulators dominate the market in the Asia Pacific region with 65.5% share. Non-Rechargeable has market share of 34.5%.

Fig 40 shows that Rechargeable spinal cord stimulators market is expected to grow at a CAGR higher than the average CAGR of Asia Pacific region. Rechargeable SCS market is expected to grow at a CAGR of 6.2% to reach a value of US\$ 183 Mn by 2027. Actual market was US\$ 94 Mn in 2016.

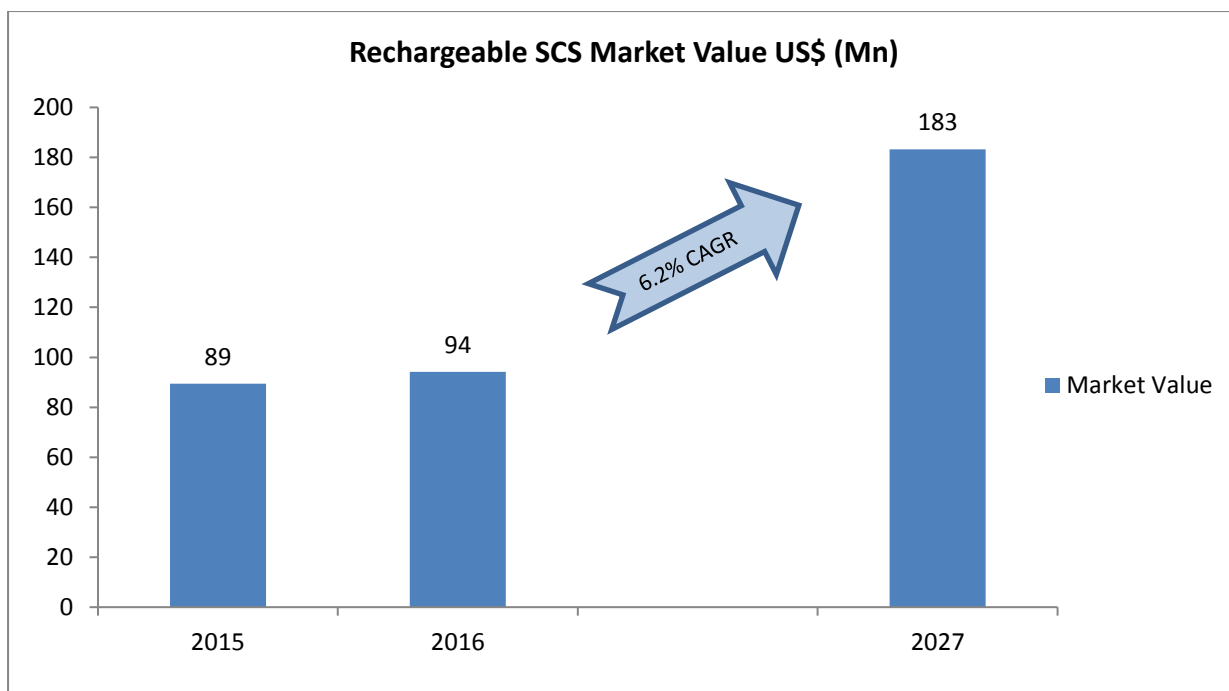


Figure 40 Rechargeable Spinal Cord Stimulators Market Value US\$ Mn in Asia Pacific

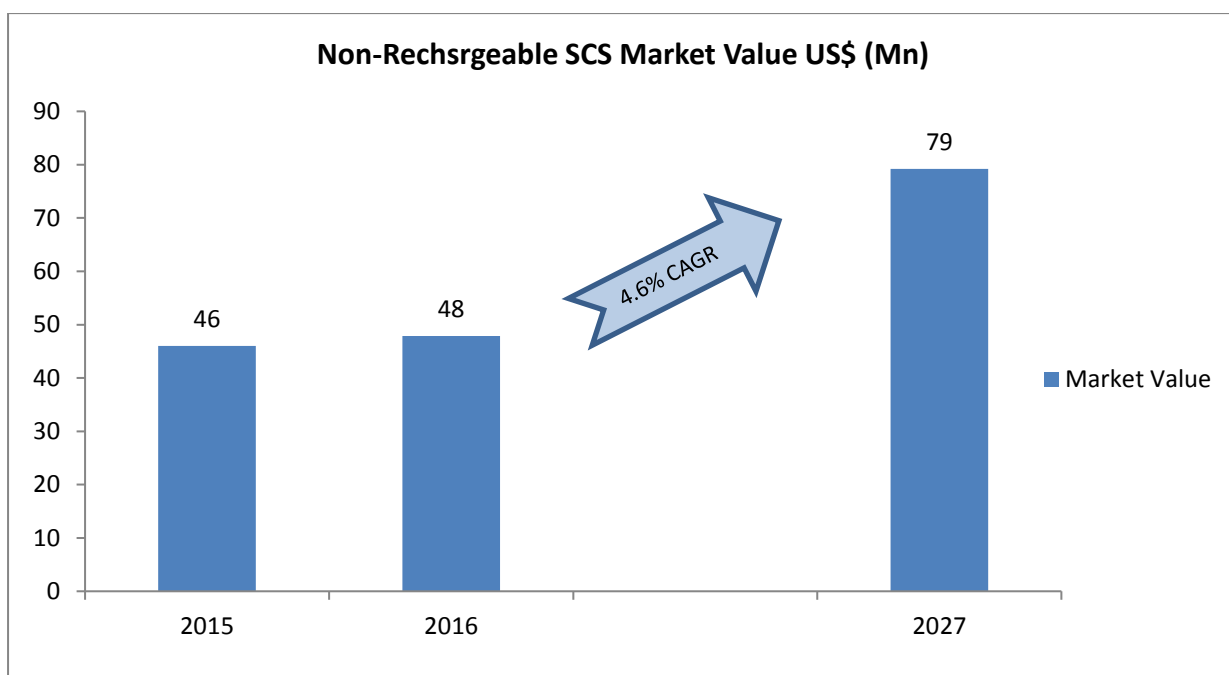


Figure 41 Non-Rechargeable Spinal Cord Stimulators Market Value US\$ Mn in Asia Pacific

Fig 41 shows that Non-Rechargeable spinal cord stimulators market is expected to grow at a CAGR lower than the average CAGR of Asia Pacific region. Non-Rechargeable SCS market is expected to grow at a CAGR of 4.6% to reach a value of US\$ 79 Mn by 2027. Actual market was US\$ 48 Mn in 2016.

7.4.2 Asia Pacific SCS Market by Application

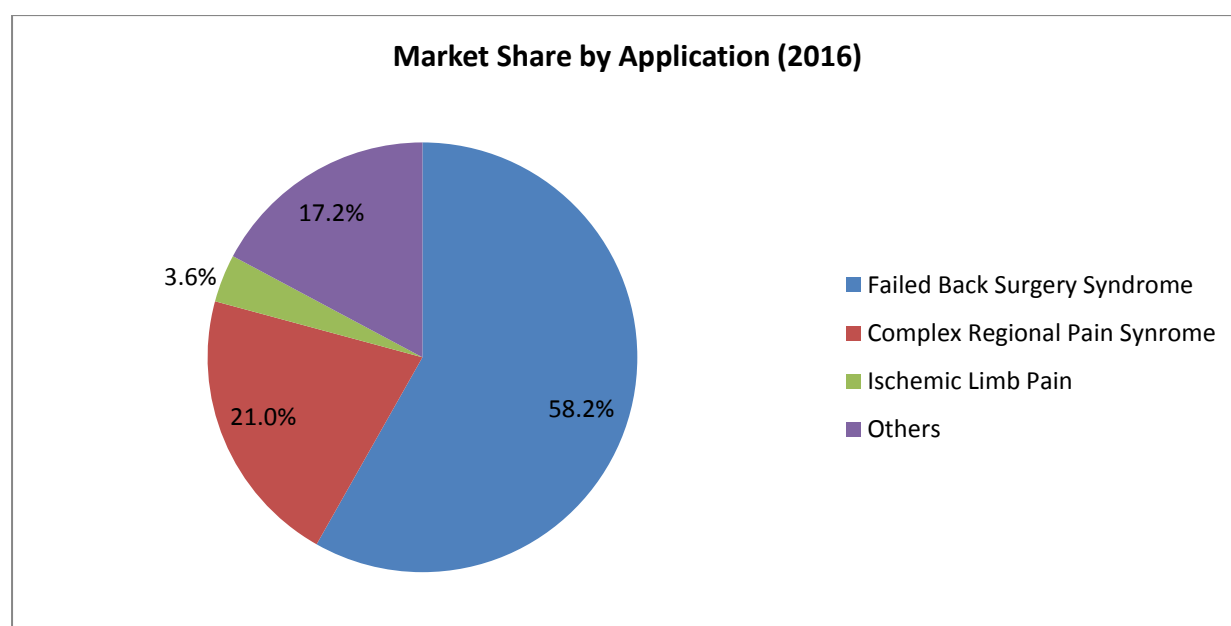


Figure 42 Asia Pacific Spinal Cord Stimulators Market Share by Application (2016)

Fig 42 shows that Failed Back Surgery Syndrome (FBBS) is leading cause for use of spinal cord stimulators followed by Complex Regional Pain Syndrome (CRPS). FBBS accounts for 58.2% market share and CRPS has 21.0% market share. Ischemic Limb Pain accounts for 3.6% and other application areas accounts for 17.2% shares.

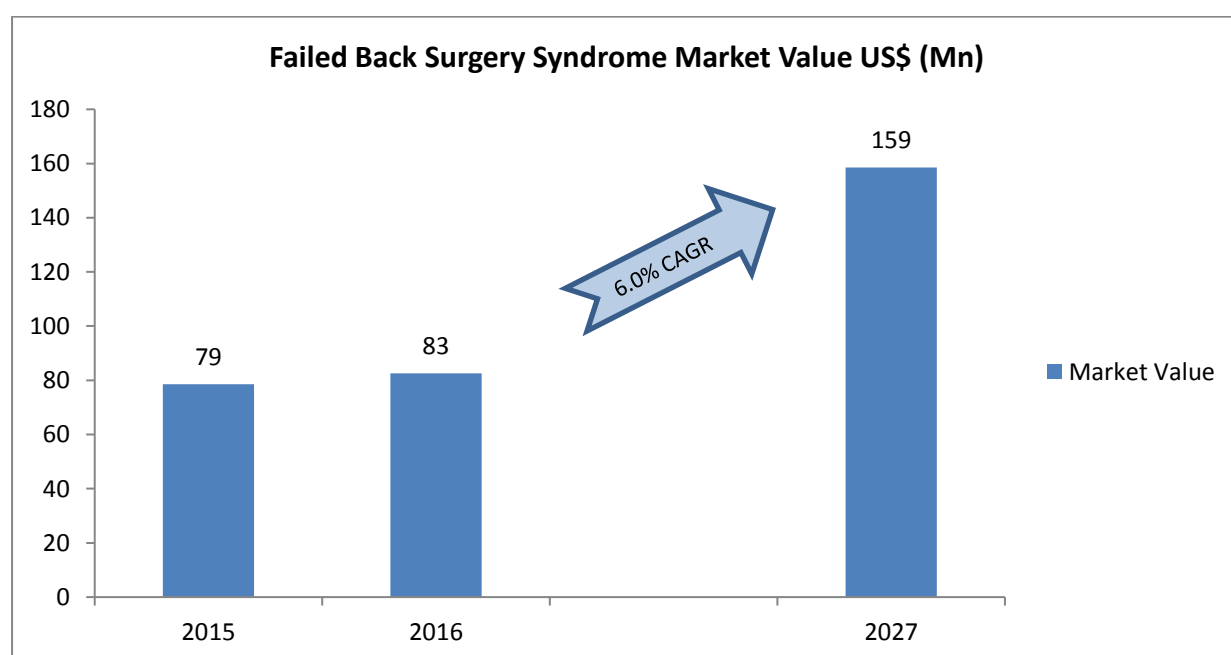


Figure 43 Failed Back Surgery Syndrome Market Value US\$ Mn in Asia Pacific

Fig 43 shows that failed back surgery syndrome is expected to grow at a CAGR of 6.0% over the forecast period which is higher than the average CAGR of Asia Pacific region. FBBS market is expected to reach the value of US\$ 159 Mn by 2027 from the US\$ 83 Mn in 2016.

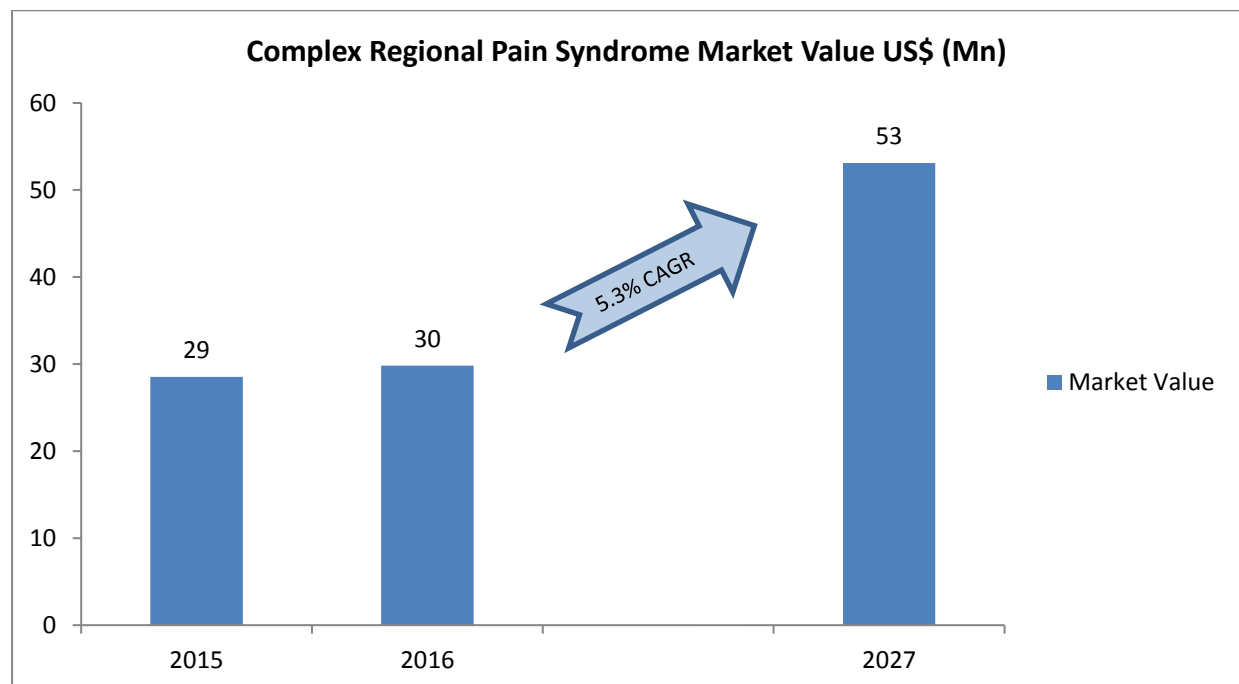


Figure 44 Complex Regional Pain Syndrome Market Value US\$ Mn in Asia Pacific

Fig 44 shows that complex regional pain syndrome market is expected to grow at a CAGR of 5.3% over the forecast period which is lower than the average CAGR of Asia Pacific region. CRPS market is expected to reach the value of US\$ 53 Mn by 2027 from the US\$ 30 Mn in 2016.

Fig 45 shows that Ischemic Limb Pain market is expected to grow at a CAGR of 4.7% over the forecast period which is lower than the average CAGR of Asia Pacific region. Ischemic Limb Pain market is expected to reach the value of US\$ 8.5 Mn by 2027 from the US\$ 5.1 Mn in 2016.

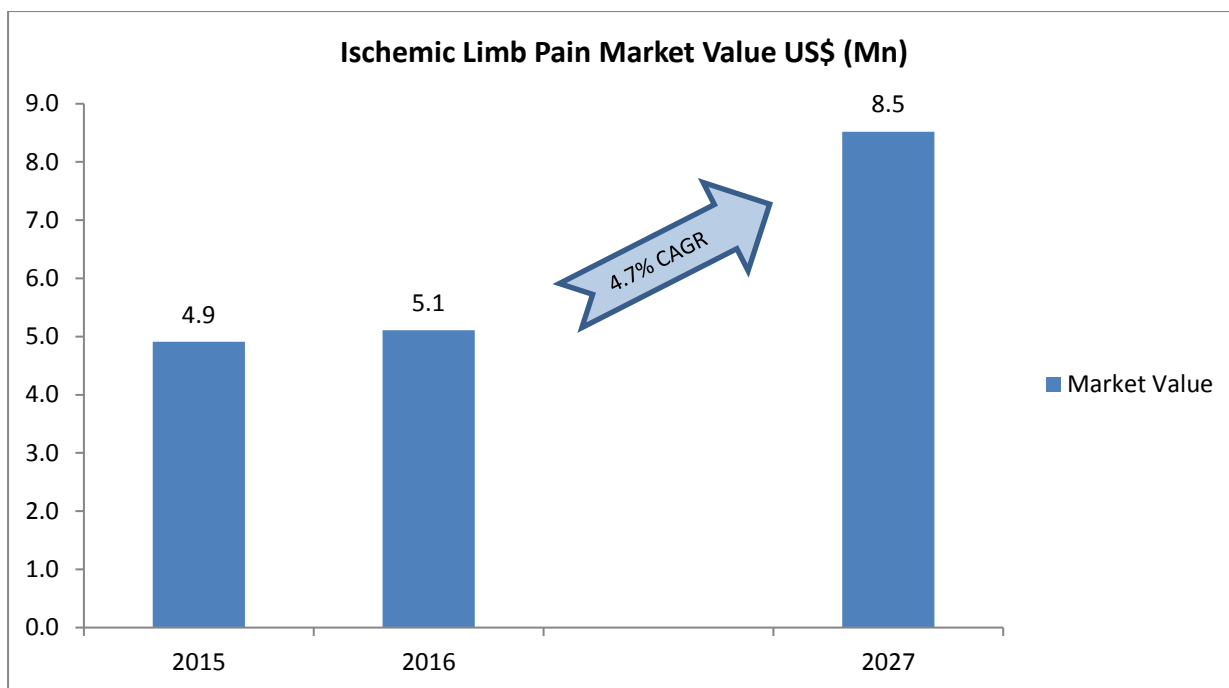


Figure 45 Ischemic Limb Pain Market Value US\$ Mn in Asia Pacific

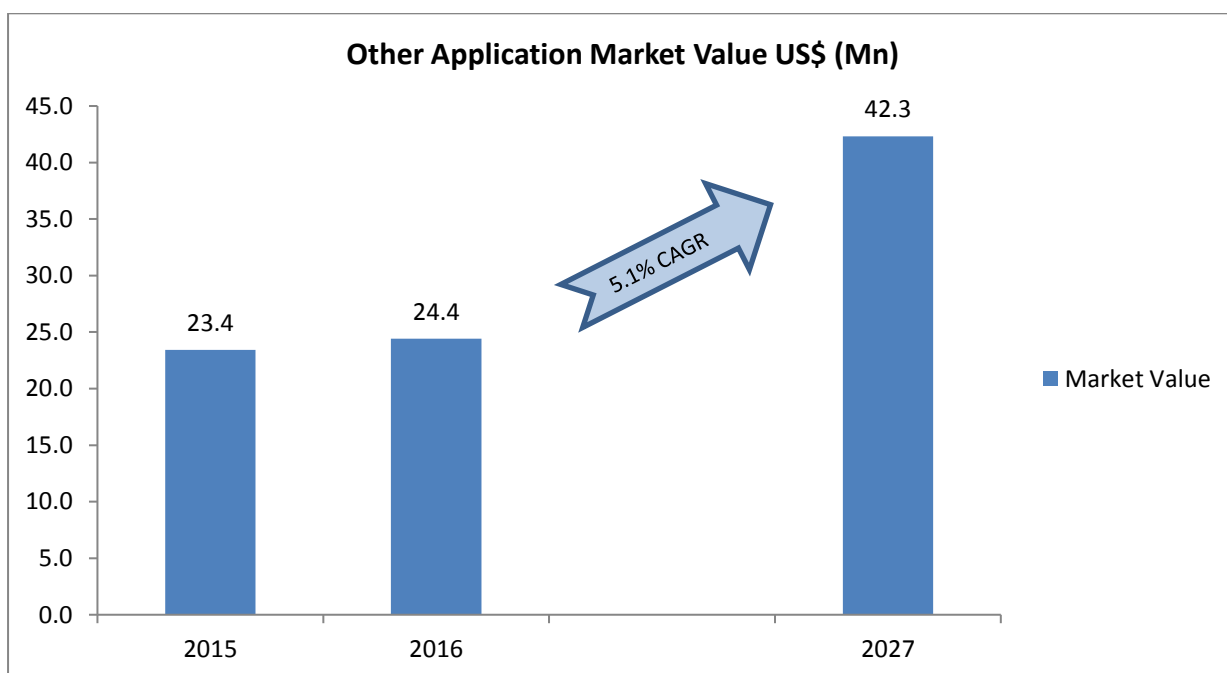


Figure 46 Other Application Market Value US\$ Mn in Asia Pacific

Fig 26 shows that market of spinal cord stimulators for the treatment of other chronic pain conditions such as, Arachnoiditis, Degenerative Disk Disease, Peripheral Vascular Disease, Multiple Sclerosis and Spinal Cord Injury will grow at a CAGR of 5.1% over the forecast

period and expected to grow to the value of US\$ 42.3 Mn by 2027. While in 2016 market of the spinal cord stimulators in treatment of others chronic pain conditions was US\$ 24.4 Mn.

Market Attractiveness

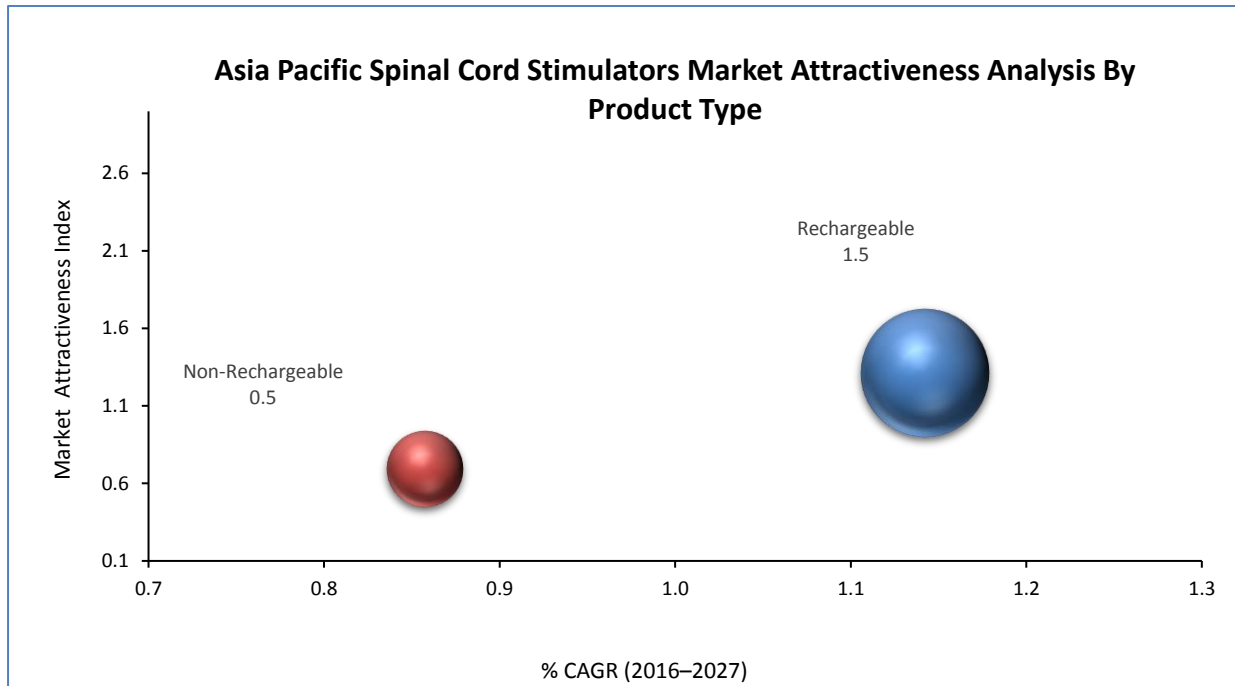


Figure 47 Asia Pacific Spinal Cord Stimulators Market Attractiveness Analysis by Product Type

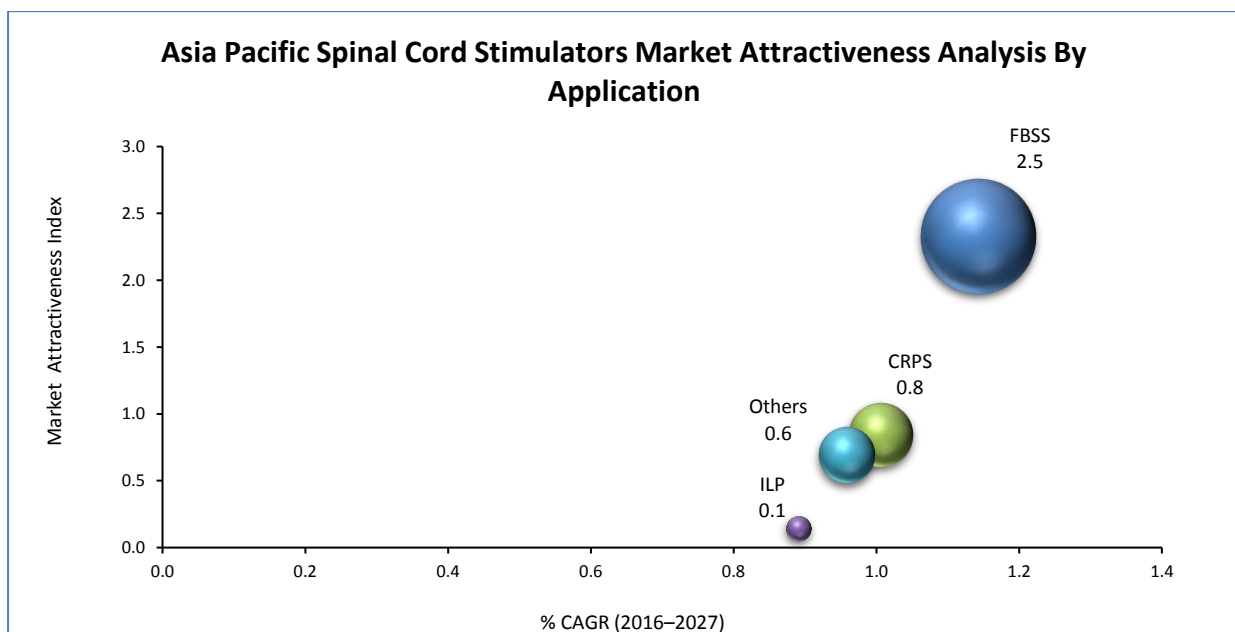


Figure 48 Asia Pacific Spinal Cord Stimulators Market Attractiveness Analysis by Application Area

Fig 47 shows that Rechargeable spinal cord stimulators segment is the most attractive segment in the Asia Pacific Market. Market attractiveness index of rechargeable spinal cord stimulators is 1.5. Non-Rechargeable spinal cord stimulators has market attractiveness index of 0.5.

Fig 48 shows that failed back surgery syndrome segment has highest market attractiveness index in the Asia Pacific market followed by complex regional pain syndrome. FBBS has market attractiveness index of 2.5 and CRPS has attractiveness index of 0.8. Ischemic limb pain has attractiveness index of 0.1 and other applications has attractiveness index of 0.6.

7.5. Rest of the World Spinal Cord Stimulators Market

Overall ROW market is expected to grow at a CAGR of 4.5%. Major regions in the rest of the world market are Latin America, Middle East and Africa.

7.5.1 ROW SCS Market by Product Type

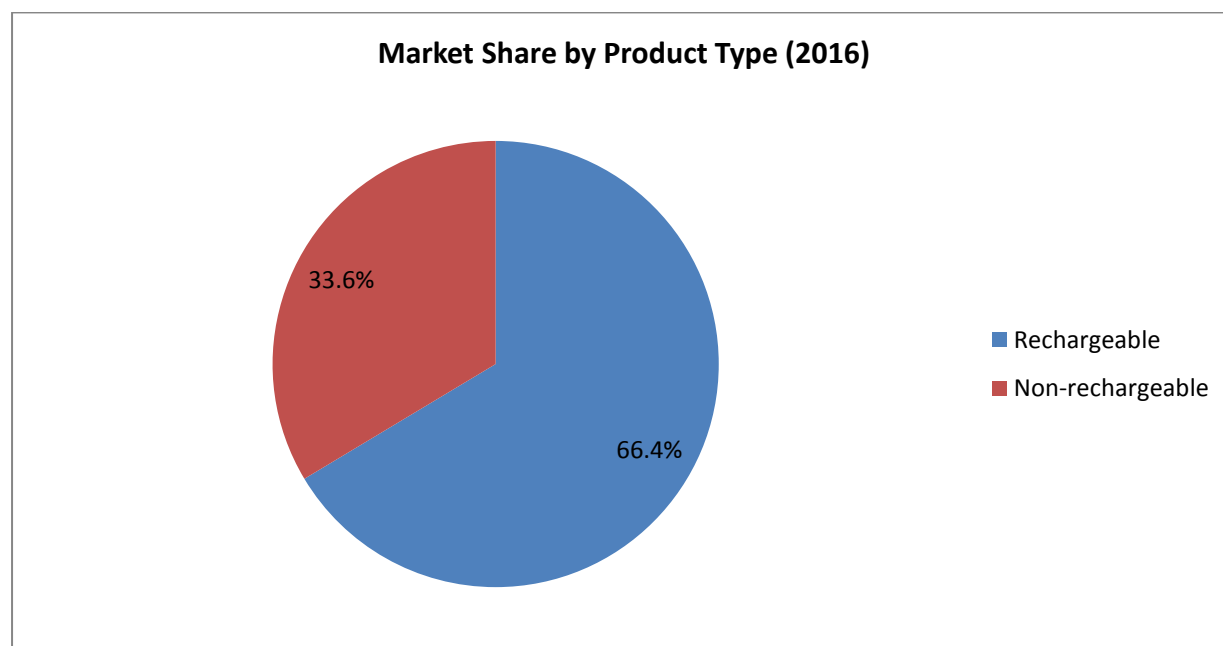


Figure 49 ROW Market Share by Product Type (2016)

Fig 49 shows the market shares of both of the product types in the ROW market. Rechargeable spinal cord stimulators dominate the market in the ROW with 66.4% share. Non-Rechargeable has market share of 33.6%.

Fig 50 shows that Rechargeable spinal cord stimulators market is expected to grow at a CAGR higher than the average CAGR of ROW market. Rechargeable SCS market is expected to grow at a CAGR of 4.7% to reach a value of US\$ 51.6 Mn by 2027. Actual market was US\$ 30.9 Mn in 2016.

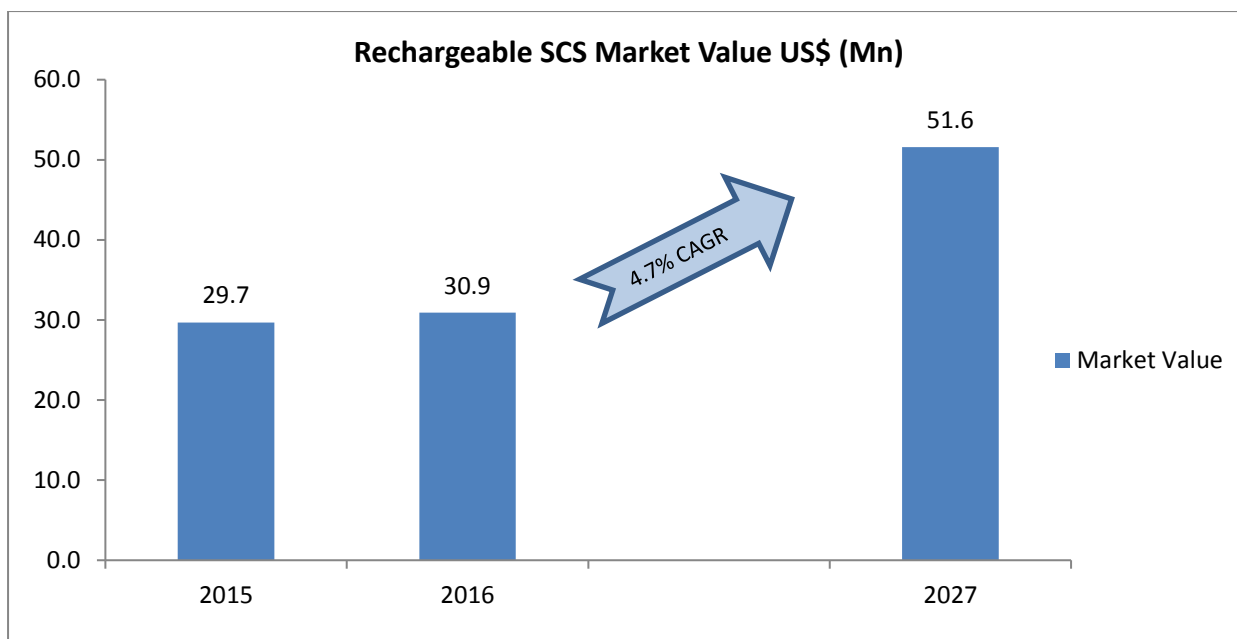


Figure 50 Rechargeable Spinal Cord Stimulators Market Value US\$ Mn in ROW

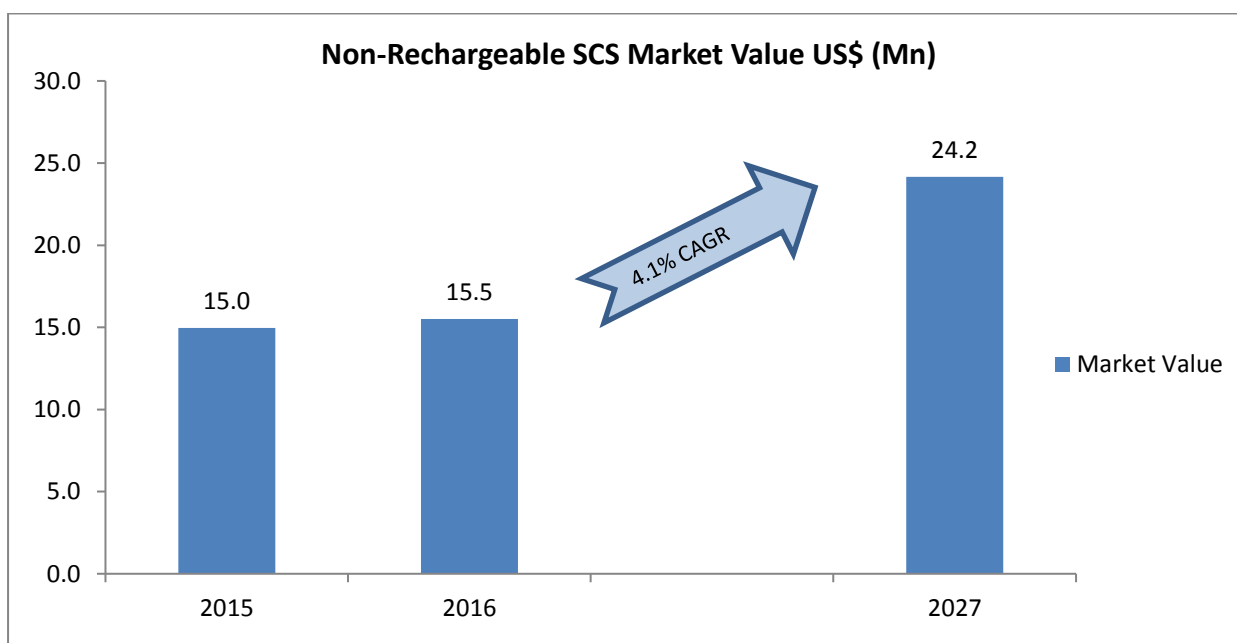


Figure 51 Non-Rechargeable Spinal Cord Stimulators Market Value US\$ Mn in ROW

Fig 21 shows that Non-Rechargeable spinal cord stimulators market is expected to grow at a CAGR lower than the average CAGR of ROW market. Non-Rechargeable SCS market is expected to grow at a CAGR of 4.1% to reach a value of US\$ 24.2 Mn by 2027. Actual market was US\$ 15.5 Mn in 2016.

7.5.2 ROW SCS Market by Application

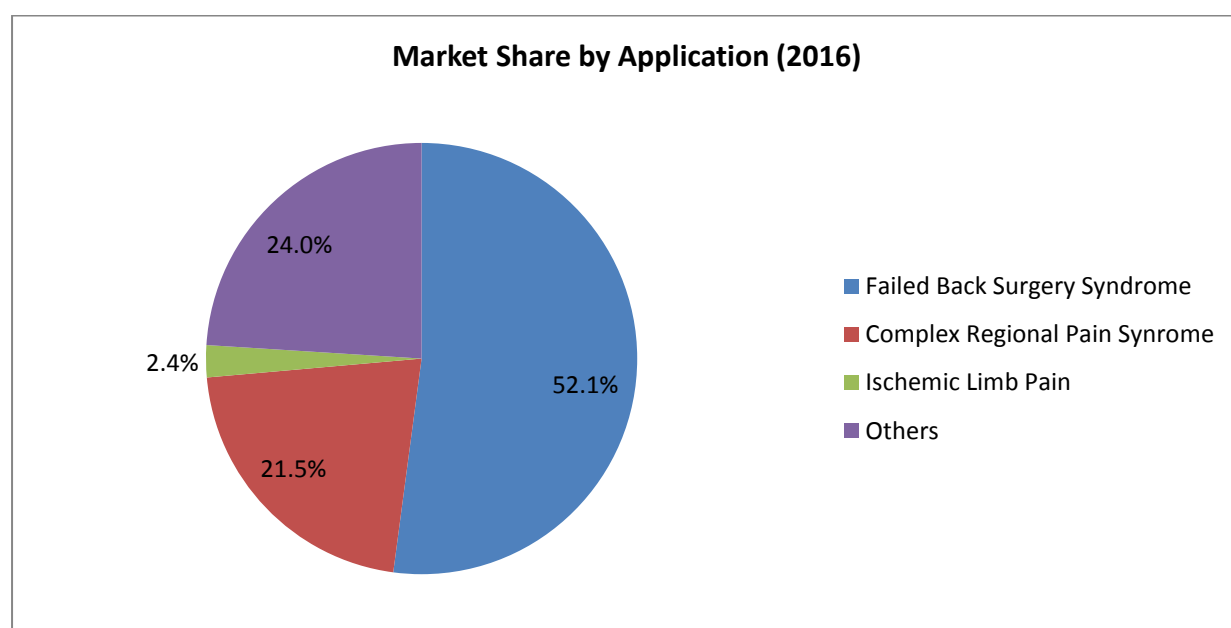


Figure 52 ROW Spinal Cord Stimulators Market Share by Application (2016)

Fig 52 shows that Failed Back Surgery Syndrome (FBBS) is leading cause for use of spinal cord stimulators followed by Complex Regional Pain Syndrome (CRPS). FBBS accounts for 52.1% market share and CRPS has 21.5% market share. Ischemic Limb Pain accounts for 2.4% and other application areas accounts for 24% market shares.

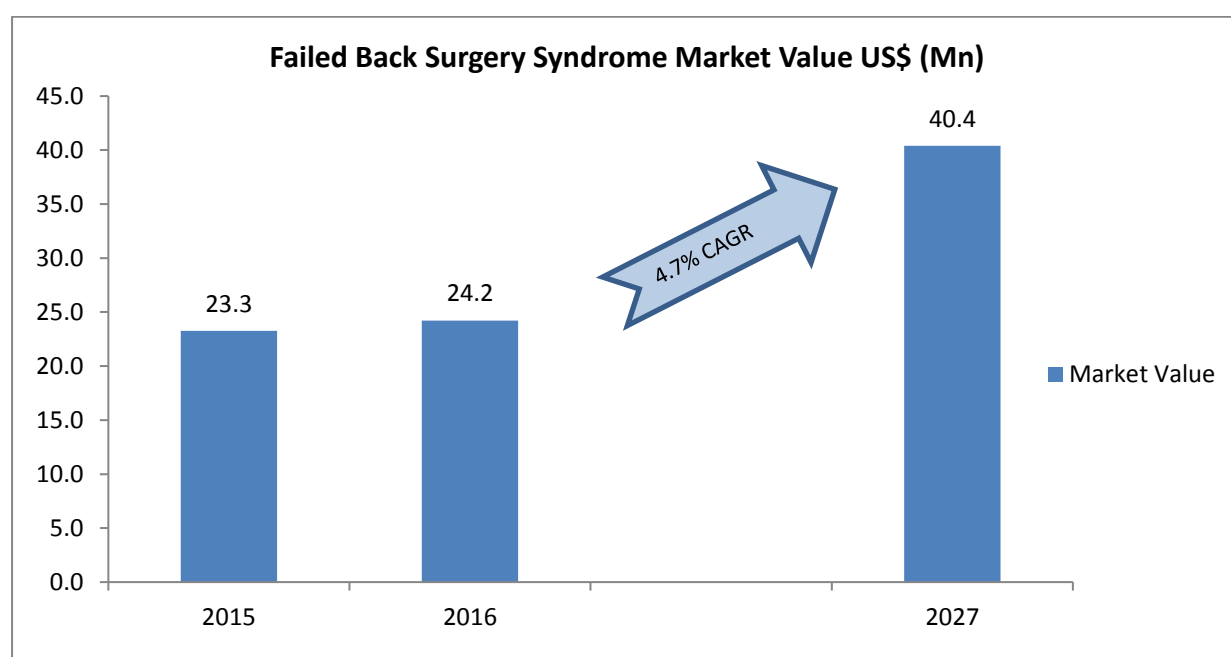


Figure 53 Failed Back Surgery Syndrome Market Value US\$ Mn in ROW

Fig 53 shows that failed back surgery syndrome is expected to grow at a CAGR of 4.7% over the forecast period which is higher than the average CAGR of ROW market. FBBS market is expected to reach the value of US\$ 40.4 Mn by 2027 from the US\$ 24.2 Mn in 2016.

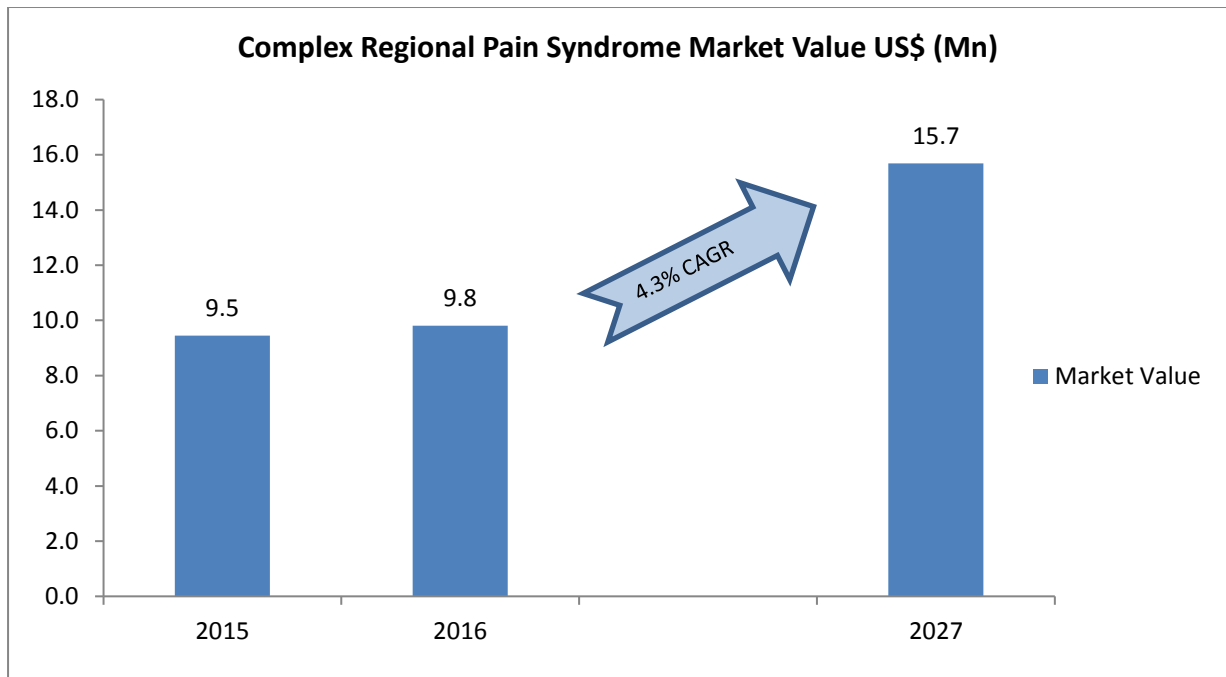


Figure 54 Complex Regional Pain Syndrome Market Value US\$ Mn in ROW

Fig 54 shows that complex regional pain syndrome market is expected to grow at a CAGR of 4.3% over the forecast period which is lower than the average CAGR of ROW market. CRPS market is expected to reach the value of US\$ 15.7 Mn by 2027 from the US\$ 9.8 Mn in 2016.

Fig 55 shows that Ischemic Limb Pain market is expected to grow at a CAGR of 3.9% over the forecast period which is lower than the average CAGR of ROW market. Ischemic Limb Pain market is expected to reach the value of US\$ 1.71 Mn by 2027 from the US\$ 1.12 Mn in 2016.

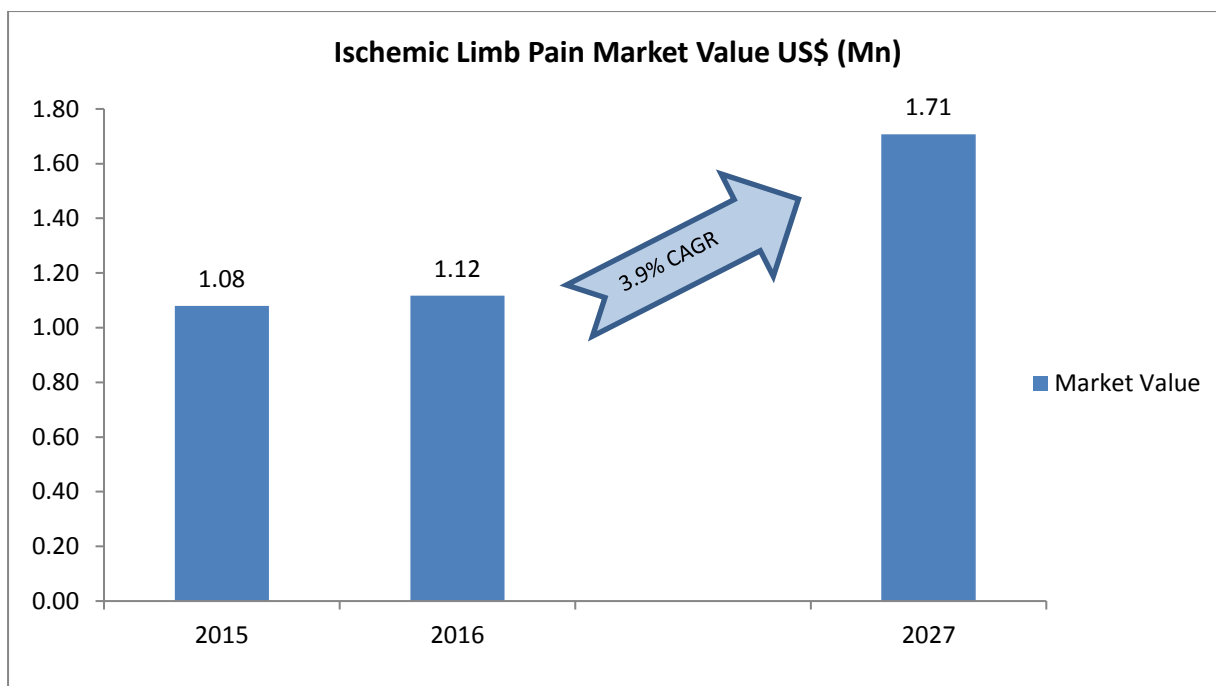


Figure 55 Ischemic Limb Pain Market Value US\$ Mn in ROW

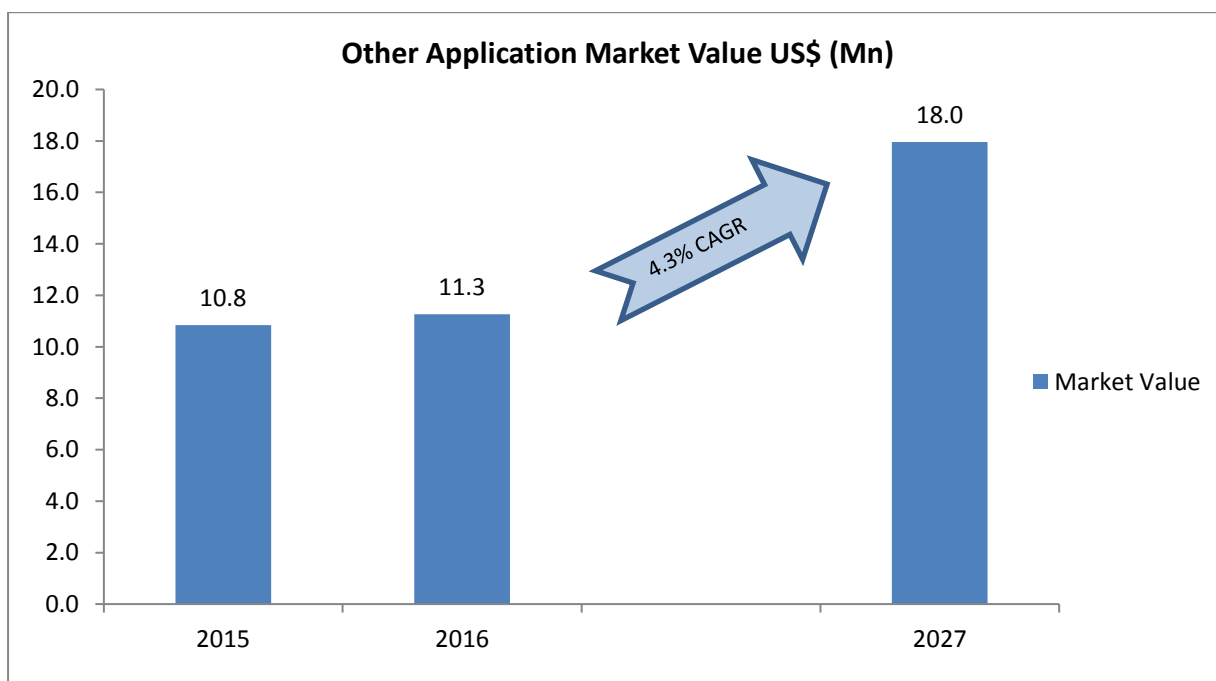


Figure 56 Other Application Market Value US\$ Mn in ROW

Fig 26 shows that market of spinal cord stimulators for the treatment of other chronic pain conditions such as, Arachnoiditis, Degenerative Disk Disease, Peripheral Vascular Disease, Multiple Sclerosis and Spinal Cord Injury will grow at a CAGR of 4.3% over the forecast

period and expected to grow to the value of US\$ 18 Mn by 2027. While in 2016 market of the spinal cord stimulators for treatment of others chronic pain conditions was US\$ 11.3 Mn.

Market Attractiveness

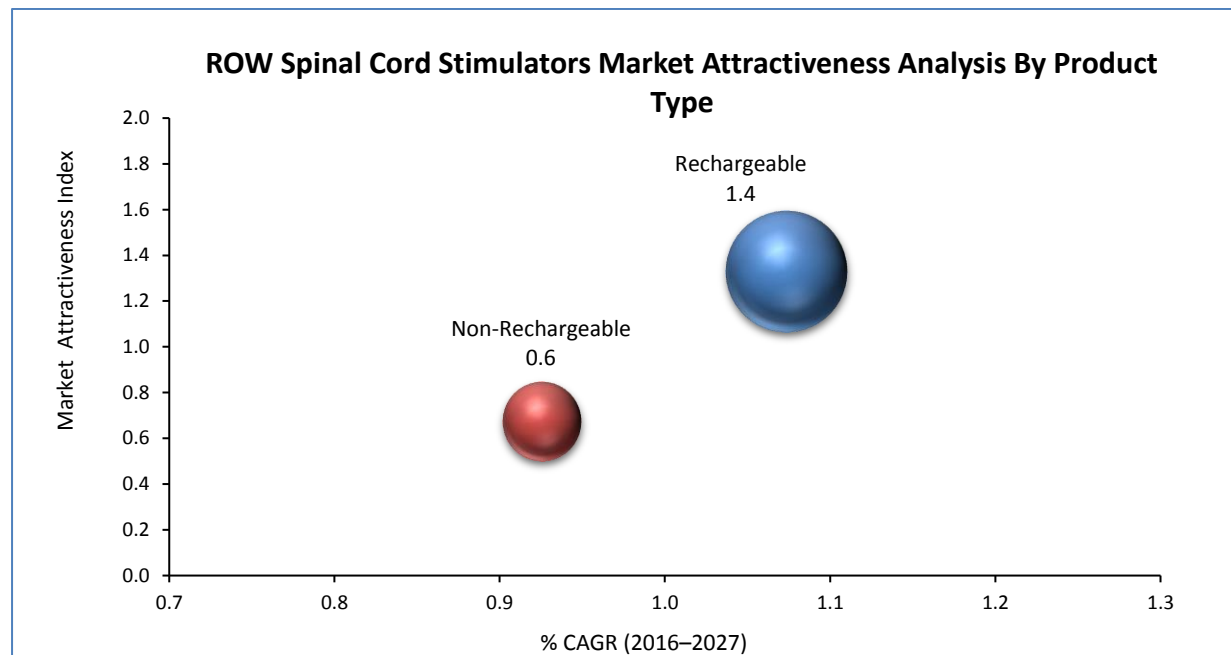


Figure 57 ROW Spinal Cord Stimulators Market Attractiveness Analysis by Product Type

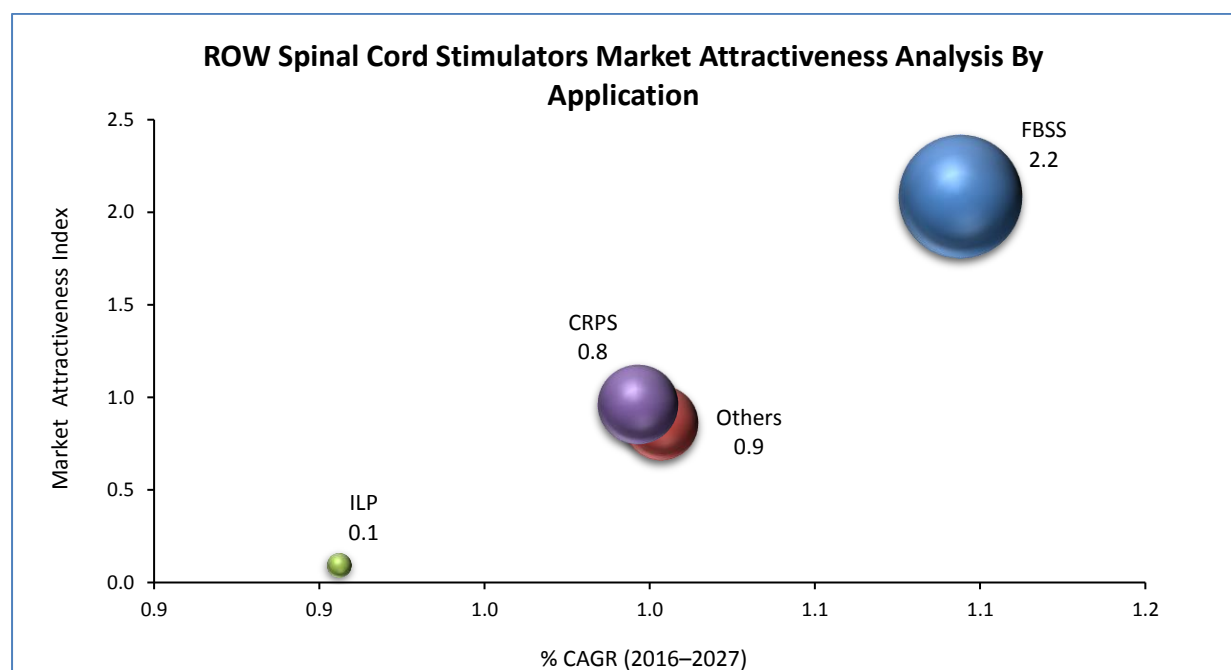


Figure 58 ROW Spinal Cord Stimulators Market Attractiveness Analysis by Application Area

Fig 57 shows that Rechargeable spinal cord stimulators segment is the most attractive segment in ROW Market. Market attractiveness index of rechargeable spinal cord stimulators is 1.4. Non-Rechargeable spinal cord stimulators has market attractiveness index of 0.6.

Fig 58 shows that failed back surgery syndrome segment has highest market attractiveness index in ROW market followed by complex regional pain syndrome. FBBS has market attractiveness index of 2.2 and CRPS has attractiveness index of 0.8. Ischemic limb pain has attractiveness index of 0.1 and other applications has attractiveness index of 0.9.

8. Qualitative Analysis

There are several factors which are expected to be growth driving factors in the global spinal cord stimulators market and also, various challenges, trends and opportunities has also been identified.

These factors can be categorised as:

8.1 Macroeconomic Factors

- **Reimbursement Policies**

Reimbursement is one of the major factors which is expected to drive the growth of the market, as these products are expensive and cost associated with the surgical procedure is very high.

- USA is biggest market of spinal cord stimulators due to its better reimbursement policy.
- SCS is a covered benefit under Medicare and other governmental health care programs, all major commercial health plans, and most Workers' Compensation programs in the U.S.
- Some private companies also cover SCS with certain conditions.

- **Cost effectiveness**

- Cost effectiveness of Spinal Cord Stimulators in comparison to Conventional Medical Management (CMM) is driving the growth of spinal cord stimulators market.
- A study conducted by Kumar K, Rizvi S, Department of Neurology, University of Saskatchewan, Canada has shown that SCS is cost-effective compared with CMM in management of chronic pain conditions.

8.2 Supply Side Drivers

- **Product Innovation**

- Companies are taking initiative in improving technology for spinal cord stimulators which is expected to expand the sale of spinal cord stimulators.
- A new SCS, Proclaim Elite Spinal Cord Stimulation system has been launched by St Jude Medical which has upgradeable technology.

- **Growing sales force**

- Companies are focusing on expanding sales force and increasing the number of professional in their sales teams.
- Nevro Corp. is focusing on the strategy of sales force expansion to increase the revenue and enhance market share.

8.3 Demand Side Drivers

- **Increasing prevalence of chronic pain**

- Increasing prevalence of chronic is increasing demand of Spinal Cord Stimulators
- According to American Academy of Pain Medicine more than 1.5 billion worldwide suffer from chronic pain and almost 100 million people are suffering from chronic pain in US only.
- Due to presence of large patient pool demand of spinal cord stimulators is increasing.

- **Increasing awareness**

- Increasing awareness regarding SCS is driving growth of this market
- Awareness among physicians is increasing which will lead to higher adoption of spinal cord stimulators.
- As a part of their expansion strategy Boston Scientific is training physician regarding SCS procedure.

- **Opioid Use Reduction**

- According to a study presented at North American Neuromodulation Society (NANS) annual meeting 2017 by Ashwini Sharan, MD and President of NANS, SCS can reduce use of opioid analgesics.
- Due to this reason SCS can be considered instead of opioid analgesics to manage chronic pain even in initial stages.

8.4 Restraints

- **High Cost associated with Spinal Cord Stimulators**
 - Higher Cost is a restraint for spinal cord stimulation market
 - Higher cost of the spinal cord stimulators is a restraint for growth in the markets where reimbursement policies are not good, especially in Asia-Pacific and Middle East & Africa. USA and Europe comprises majority of the market due to better reimbursement policies.
 - Procedural cost and maintenance cost associated is also very high which is restricting the growth of the market.
- **Complications Associated**
 - Complications associated with Spinal Cord Stimulators can be a restraint
 - Spinal Cord Stimulators cause paraesthesia; a sensation typically experienced a tingling, numbness and buzzing.
 - According to survey released by Medtronic shows that 71% of the patients find paraesthesia uncomfortable which can lead to removal of the system

8.5 Opportunities

- **Under penetration of Market**
 - Spinal cord Stimulators market is highly under penetrated market.
 - Less than 10% potential patients are being treated with spinal cord stimulators, which provide a huge opportunity for the companies.
- **Individualized SCS**
 - Customized spinal cord stimulators are future.
 - According to a study conducted by Center for Pain Medicines, Netherland every person reacts differently at different frequency.
 - This is an opportunity for the companies to make customized spinal cord stimulators according to the need of patient.
- **Miniaturization of spinal cord stimulators**
 - Miniaturization of SCS is opportunity for the companies as small sized products and easy to implant which will increase demand for this system.
 - Stimwave launched a small size SCS which is 95% smaller then the already existing products.

8.6 Trends

- **MRI Compatibility**

- MRI can cause complication to the implanted SCS system due to this reason all the major companies are developing MRI compatible spinal cord stimulators.
- Some of the recently launched MRI compatible SCS are:
- RestoSensor SureScan MRI Neurostimulator by Medtronic plc.
- Precision Montage MRI Spinal Cord Stimulators

- **Increasing Battery Life**

- Companies are focusing on increasing battery life of the spinal cord stimulators.
- Major focus is on development of rechargeable system with better battery life.
- Precision Plus launched by Boston Scientific has rechargeable battery that can last up to 25 years without replacing.

- **Consolidation in The Industry**

- Industry is following merger & acquisition strategy to expand product portfolio and increase market shares
- In 2015, St Jude Medical completed acquisition of Spinal Modulation, Inc.
- In 2016, St Jude Medical was acquired by Abbott.
- In 2004, Boston Scientific acquired Advanced Bionic Corporation developer of Precision SCS system

9. Competition Analysis

Spinal cord stimulator has shown a huge market potential. Even though SCS is in the market for more than four decades but there are currently only six players in the market. Spinal cord stimulator market is showing growth since last decade and many new products has been launched recently. Before 2010 there were only three players in the market but new companies are entering the market with new innovative products and it is expected that many more players will enter in this market.

9.1 Companies

9.1.1 Medtronic Public Limited Company

- Medtronic is one of the world's largest medical technology, services and solutions companies- alleviating pain, restoring health, and extending life for millions of people around the world.
- It is present in more than 160 countries at 480 locations.
- It was founded in 1949 and it's headquarter is in Dublin, Ireland.
- Medtronic was the first company to launch spinal cord stimulator.
- Spinal Cord Stimulator is a sub-segment of Medtronic's restorative therapies segment.

Products

Sr. No.	Rechargeable SCS	Non-Rechargeable SCS
1	RestoreSensor SureScan MRI Neurostimulator	PrimeAdvanced SureScan MRI neurostimulator
2	RestoreUltra SureScan MRI Neurostimulator	
3	RestoreAdvanced SureScan MRI Neurostimulator	

9.1.2 Boston Scientific Corporation

- Boston Scientific Corp is a worldwide developer, manufacturer and distributor of medical devices.
- The Company offers its products in areas such as radiology, cardiology, endoscopy, oncology, urology, gynecology, vascular surgery and Neuromodulation.
- Boston Scientific Corp is present in 100+ countries and offer more than 13 thousand life changing products.
- Boston Scientific was founded in 1979 and it's headquarter is in Marlborough, Massachusetts, United States.
- Boston Scientific was the first company to launch world's first rechargeable spinal cord stimulator in 2005.
- Spinal Cord Stimulator is a sub-segment of Boston Scientific's Neuromodulation segment.

Products

Sr No.	Rechargeable SCS	Non-Rechargeable SCS
1	Precision Montage MRI System	Precision Novi System
2	Precision Spectra System	Precision System

9.1.3 St. Jude Medical LLC

- St Jude Medical, LLC is one of the biggest medical devices manufacturers.
- Company has 21 principal operating and manufacturing units spanning four continents.
- Company sell its products in more than 100 countries.
- In Jan 2017, Abbott completed acquisition of St Jude Medical
- St Jude Medical was founded in 1976 and it's headquarter is in St Paul, Minnesota, US.
- Spinal Cord Stimulator is a sub-segment of St Jude's Neuromodulation segment.

Products

Sr. No.	Rechargeable SCS	Non-Rechargeable SCS
1	Prodigy MRI chronic pain system	Proclaim Elite Recharge-free IPG
2		Axium Neurostimulator System

9.1.4 Nevro Corp.

- Nevro is a global medical device company focused on providing innovative products that improve the quality of life of patients suffering from debilitating chronic pain.
- Nevro Corp was founded in 2006 and it's headquarter is in Redwood City, California, USA
- Nevro has developed and commercialized the Senza spinal cord stimulation (SCS) system, an evidence-based Neuromodulation platform for the treatment of chronic pain.
- The Senza system is the only SCS system that delivers Nevro's proprietary HF10 therapy.

9.1.5 Nuvectra Corporation

- Nuvectra Corporation is engaged in the development and commercialization of neurostimulator devices for treatment of various disorders through stimulation of tissues associated with the nervous systems.
- It also supports neurological indications such as sacral nerve stimulation, and deep brain stimulation.
- Nuvectra was founded in 2008 and it's headquarter is in Plano, Texas, United States
- Its product, Algovita Spinal Cord Stimulation System, treats chronic pain of the trunk and limbs.

9.1.6 Stimwave Technologies Inc.

- Stimwave Technologies Inc. is a privately-held medical device company
- Company is engaged in the development, manufacture, commercialization and marketing of wireless micro size injectable medical devices for neurology.
- Stimwave was founded in 2010 and its headquarter is in Fort Lauderdale, Florida, USA
- Stimwave has Freedom spinal cord stimulation system which is 95% smaller than all other available devices.

9.2 Competitive Dashboard

Company	Product Offerings		Regional Presence			
	Rechargeable	Non-Rechargeable	North America	Europe	Asia Pacific	ROW
Medtronic PLC	A	A				
Boston Scientific	A	A				
St Jude Medical	A	A				
Nevro Corp	A	NA				
Nuvector Corp	A	NA				
Stimwave	A	NA				

A- Available NA- Not Available

Strong Moderate Low

10. Conclusion

Chronic pain is a major healthcare problem globally. Approximately, 20% of the global population is suffering from the chronic pain. Spinal cord stimulators have shown better effectiveness in the management of chronic pain in comparison to conventional medication treatment. Spinal cord stimulator implantation is cost effective then the medication treatment over the life time of patient. This report provides the market potential of spinal cord stimulators and various factors driving the growth of market. Market will continue to grow in the coming years and adoption of these devices is increasing due to increasing awareness. Reimbursement is also increasing, which is also increasing the market. Rechargeable devices will grow faster than the non-rechargeable spinal cord stimulators owing to longer battery life these devices. North America is dominating the market due to better reimbursement policies.

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