



**Postgraduate studies in Business Administration**

**Master's Thesis:**

**ROAD MAP FOR THE STRATEGIC DEVELOPMENT OF  
KLEEMANN TO THE U.S & CANADA**

Submitted by

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## **Dedication**

*To my family, Dimitrios Gkampranis , Michael Gkampranis and Irene Prodromidou, for all their love and support and putting me through the best education possible.*

## **Abstract**

The purpose of this thesis is to research and evaluate the North America construction and elevator market and understand the differences between the U.S. and Canada Elevator Standards with the European one. In order to gain the in depth knowledge required for the thesis case study KLEEMANN's development, will be analysed the current and future construction and elevator situation in North America and the methodology that KLEEMANN should follow to gain a market margin and be competitive in this demanding market. Many conclusions were drawn based on the results of research.

KEYWORDS: (Development, Elevator, the U.S, Canada, Construction Market)

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### Acronyms

ASME – American Society of Mechanical Engineers

CPSC – The U.S. Consumer Product Safety Commission

NAEC - National Association of Elevator Contractors

NEII® - National Elevator Industry, Inc.

## **0. Executive Summary**

The market for new elevators reflects general economic trends and is inexorably tied to developments in the construction industry. The slowdown in construction industry growth in 2001 was very marked in North America. The financial crisis and recession of 2008 brought on more negative prediction threatening market development. Since the turn of the decade into the 2010s, the pace of new construction can be split into two large categories: large-scale urban regeneration and super-slim luxury residential infill pioneered by NYC. In many ways, Canada mirrors the U.S. in economic health and construction activity.

A major joint effort by elevator labor and management was begun in 2000 to all the U.S. states to develop and adopt legislation to make conformance with a proposed model elevator code mandatory. This process is still ongoing making each state a self-regulated market.

Most elevators in North America are hydraulic. However, the market is expected to witness a decline as geared and gearless elevators gain popularity. The market is expected to witness growth as requirements for building performance and safety become more stringent. Further, technological innovations and regular maintenance and upgrades will also contribute to overall growth in the market.

The industry has a low level of market share concentration, with the four largest players accounting for less than 25.0% of annual industry revenue. The industry contains many small-scale contractors who operate in either geographic or specialized markets.

In terms of revenues resources, the elevator market derives 40% of its revenues from the sale of new equipment and 60% from maintenance and modernization services.

## 1. Situation Analysis

### 1.1. Global Lift Industry Overview

With the growth in construction and real estate sector, the demand for elevator and escalator is gradually increasing. This market can be broadly segmented on new installation, modernization and maintenance. Revenue generated from new installation accounts for around half of the total market while the modernization and maintenance together contribute the remaining half.

Emerging countries such as China, India and Brazil are driving the new installation segment whereas the service segments are witnessing steady growth from the developed countries such as the US the UK, France and Germany, among others.

The global elevators and escalators market is expected to grow at a CAGR of 4,1% by the year 2020, according to the Global Elevators & Escalators Market 2016-2020. According to an Analysis and Forecast from 2014 to 2020 by Supradip Baul, Research analyst at Markets and Markets, the CAGR will reach 5,2% from 2015 to 2020.

Figure 1: Global Elevator and Escalator Market 2014-2020

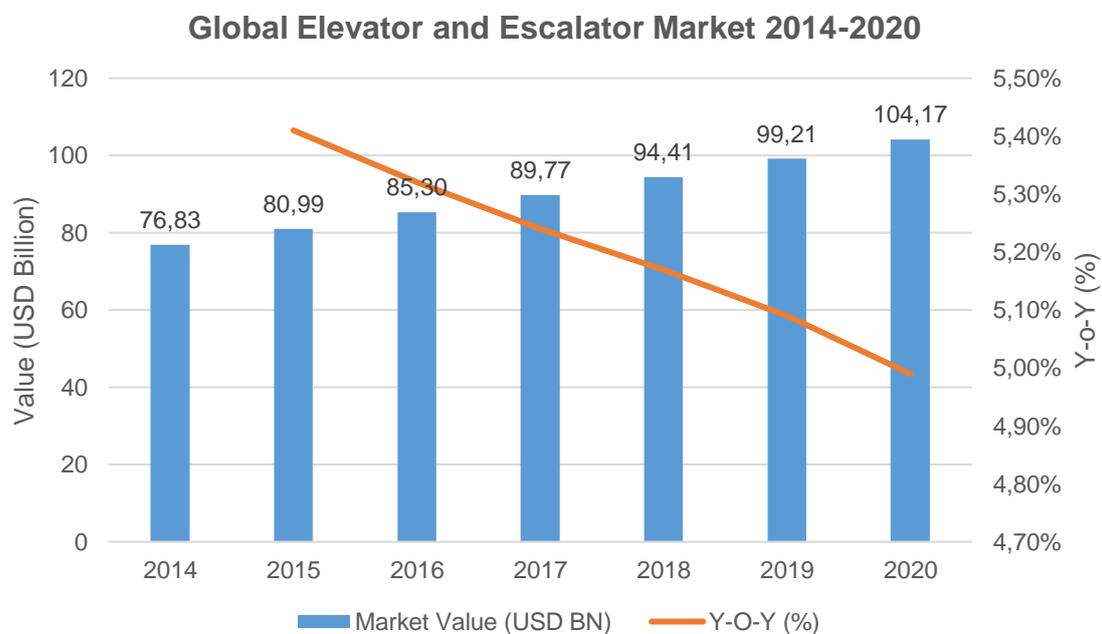


Table 1: Global Elevator and Escalator Market

Global Elevator and Escalator Market		2014	2015	2016E	2017E	2018E	2019E	2020E	CAGR (2015-2020)
Market Value (USD Billion)		76,83	80,99	85,30	89,77	94,41	99,21	104,17	5.2%
Y-O-Y (%)			5,41%	5,32%	5,24%	5,17%	5,09%	4,99%	

Source: Supradip Baul, Research analyst at Markets and Markets

The global elevator and escalator market was valued \$76.83 billion in 2014 and expected to reach \$104.17 billion by the end of 2020 with an estimated CAGR of 5.2% from 2015 to 2020.

#### Key Highlights:

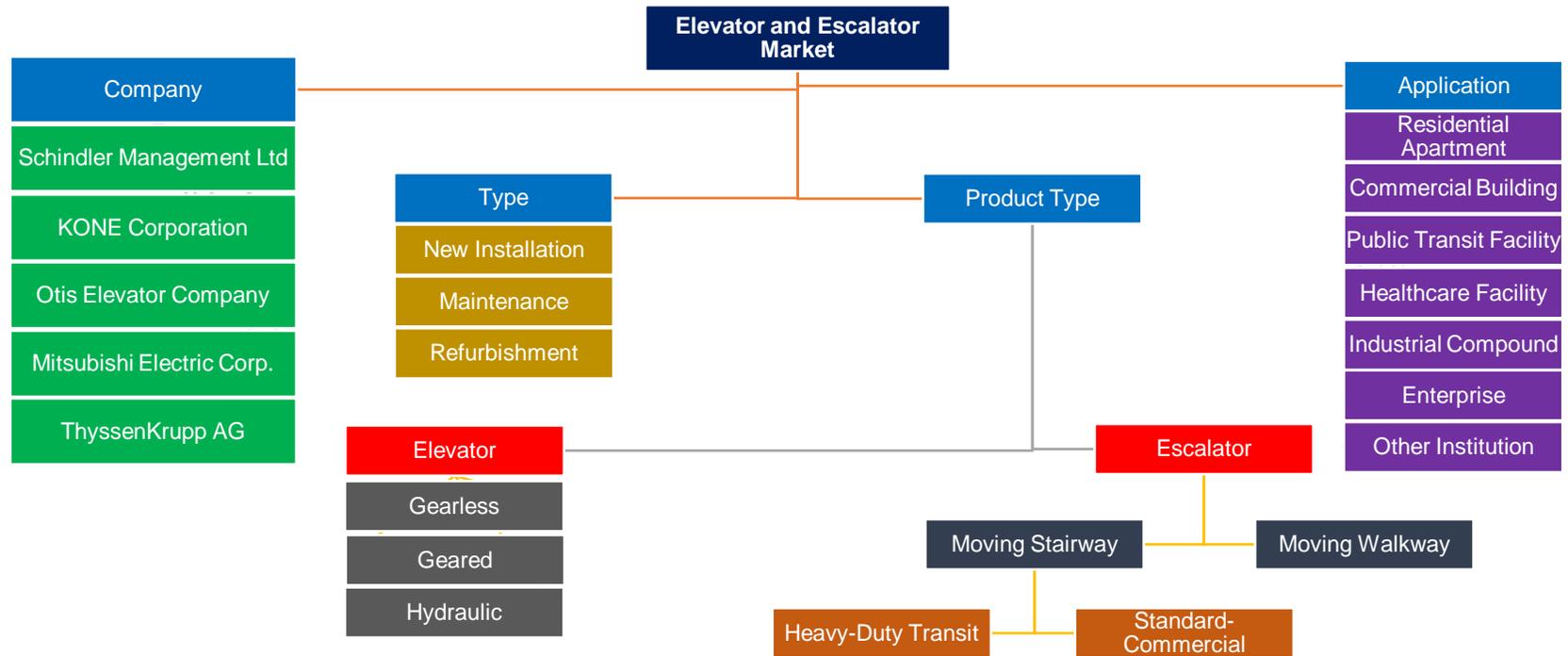
- The Global Elevators & Escalators market is highly consolidated with more than two third of its revenue coming from the top 5 players in the industry. But there are many local players who cater to the needs of their locality and compete with the other international players.
- New installation market is declining due to global slowdown and expected to register marginal 2% growth rate till 2020.
- Maintenance market is expected to grow by CAGR 6% and Modernization market will be growing at CAGR 10% by the end of 2020. Elevators are majorly segmented in Gearless, Geared and Machine Room Less (MRL).
- According to NOVONOUS Research Company, Gearless will be growing at 5%, MRL will be growing at 6% and Geared will register -2% CAGR by end of 2020. On the other hand Escalators are divided in Moving Walkways and Moving Stairways segment which is growing by CAGR 6% and 7% respectively till 2020.
- Market Drivers: There are four major market drivers in the industry. 1. Urbanization growth 2. Ageing population 3. Codes and Regulations 4. Construction and Real estate industry growth 5. Demand for Environment friendly products

## **1.2. Market Segmentation**

Global elevator and escalator market is segmented and classified on the basis of:

- ✓ Type: Based on type, the market is segmented into: new installation, modernization and maintenance.
- ✓ Product type: Based on product type, the market is segmented into: elevators and escalators, which is further classified on the basis of their type, and application.
- ✓ Application: Based on application, the market is segmented into: residential apartment, commercial building, public transit facility, healthcare facility, industrial compound, enterprise, and other institution.
- ✓ Geography: Based on geography, the market is segmented by major regions such as North America, Europe, Asia-Pacific, Middle East and Africa, and South America.

Figure 2: Market Segmentation of Global Elevator and Escalator Market



## 1.3. Market Characteristic

### 1.3.1. Trends

*Figure 3: Top impact factors*



*Source: Allied Market Research*

**Introduction of Green Technology:** Most of the manufacturers are focusing on developing Eco-friendly technologies that save power and energy, and thereby reduce their carbon footprint. For instance, Schindler has developed solar power enabled elevator that saves significant amount of energy by drawing its power directly from the sunlight.

**Increasing Role of Elevators Consultants:** The past few years, there has been a significant increase in the number of services and modernization contracts in this industry owing to the increasing frequency of vertical transport worldwide. This has created employment opportunity and serves as a regular source of income for several companies.

**Emergence of smarter and faster elevators:** The emergence of smarter elevator is transforming the industry. These elevators are equipped with high and card reading sensor technology that reads the ID card of the authorized personal and verifies it with the data base before providing access to the highly confidential and private structures. Once verified, it automatically lifts the person to the relevant floor in the building.

### **1.3.2. Drivers**

**Increasing Urbanization:** The increasing movement of the people from rural to urban areas has pushed the demand for multi-storied residential apartments in the urban areas. Also, with the increase in disposable income and aging population, the elevator and escalator market is expected to witness tremendous growth from the developing countries, especially from China and India.

**Need of Rapid and Efficient Transit System at Public Places:** There is a significant raise in the construction of shopping malls, airports, railway stations over the past few years. Such constructions have created huge opportunity for vertical transport industry as elevators and escalates provide commuters/users with ease of transit to desired location in a very short time.

**Technological Development:** With the advancement of technology, manufacturers are now capable of offering sophisticated elevators and escalators with better designs and attractive features. Elevators that allow bird eye view of the city during transit, elevators with LED displays, music playback, and other features are witnessing soaring demand from 5 star hotels, high end commercial and corporate complexes.

### **1.3.3. Challenges / Issues**

**Lack of Trained Manpower:** Availability of skilled workforce is one of the major bottleneck of this market. Usually, there is an interval of one to three years for a newly installed equipment to demand repair work. Thus sufficient number of skilled workforce is required to bolster the market growth.

**Stringent Government Regulation:** Overemphasis on regulatory measures, and related approvals required from the governing bodies affect the growth of the market. Further, government regulations on import and export of heavy equipment, regulation to carve investment, and other political issues hinder the growth potential of elevator and escalator market.

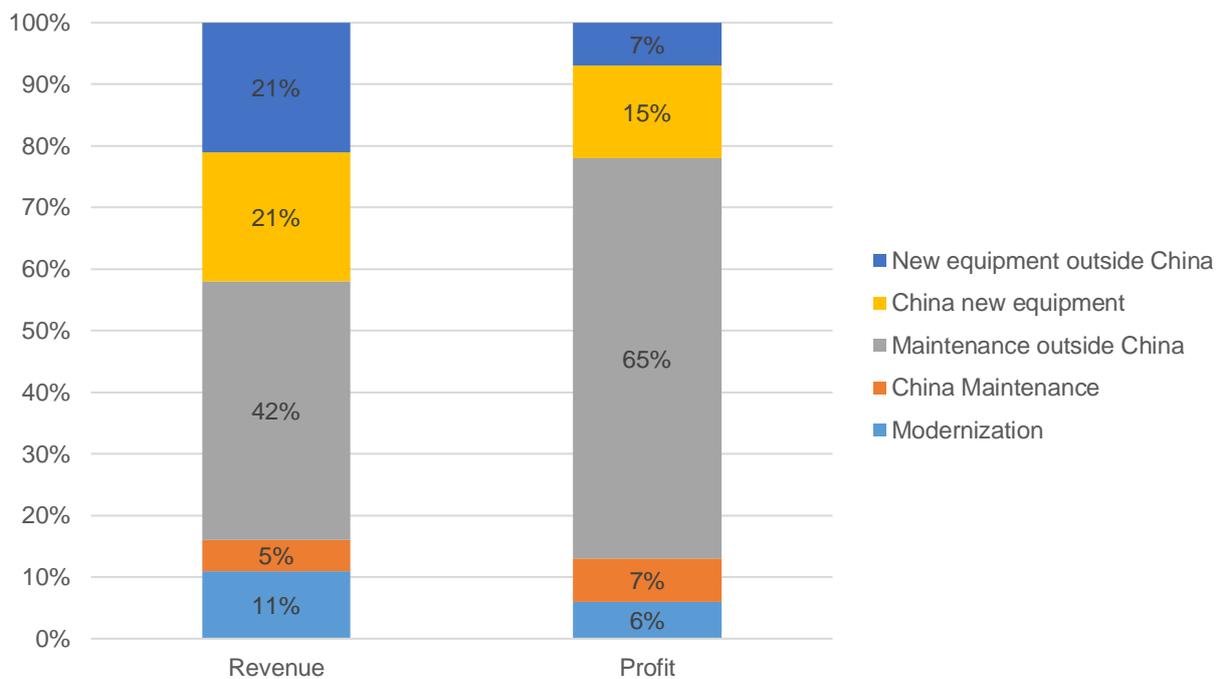
**Pricing Pressure:** The key players in the global elevator and escalator market are witnessing stiff price competition from the local players, especially in the area of maintenance of installed equipment. However, multinational players are now working on formulating technologies

towards lowering down their maintenance charges to address the budgetary constraints of local customers and thereby securing the significant share in the service sector.

### 1.3.4. Revenues

As shown above the overall market value has grown at 5,37% Compound Annual Growth Rate (CAGR) between 2014-2016. With 46% of the market revenue and more than 70% of the market profit pool attributable to maintenance, the market value-creation model continues to be based on installed maintenance base growth driven by new equipment additions.

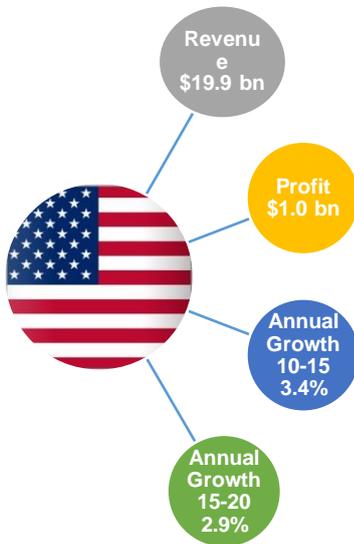
Figure 4: Global market revenue and profit pool structure



Source: Credit Suisse

## 2. Lift Industry Analysis

Figure 5: Key Statistics snapshot



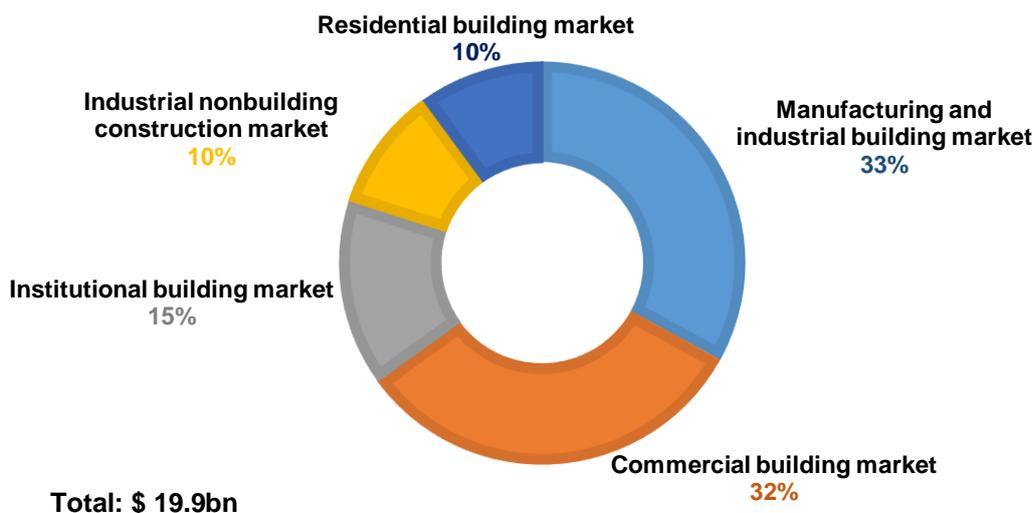
Source: Ibisworld

### The U.S

The performance of the Elevator Installation and Service industry in the U.S is heavily dependent on investment in nonresidential construction and new capital equipment. Activity is evenly spread between millwrights contracting, particularly work on material-handling equipment, and elevator servicing. Companies within the elevator-servicing segment generate a large portion of revenue from elevator installations in new multiunit residential and nonresidential structures,

and from repair, maintenance and modernization work. Since economic activity began picking up following the recession, industry operators have experienced steadily increasing demand for elevator installation projects, a rebound from the sharp contractions that occurred during the recession. In 2012, industry revenue grew sharply alongside the recovery in key construction markets.

Figure 6: Major market segmentation (2015)



Source: Ibisworld

The commercial building market, which represents 32.0% of total industry revenue, has been one of the primary drivers of this growth. The value of private nonresidential construction is increased 3.4% in 2015, driving demand for installation services because most retail and office structures require elevators. Industry revenue is anticipated to reflect downstream demand growth, with an increase of 2.4% in 2015. Over the past five years, industry revenue is expected to increase at an average annual rate of 3.4% to \$19.9 billion in 2015, far above its recessionary low. Repair and maintenance contracts provided an important cushion for many operators facing volatile downstream demand at the start of this period. However, this segment is expected to account for a smaller share of revenue as new construction activity picks up in the next five years. During this period, the value of private nonresidential construction is expected to increase at an average annual rate of 3.0%. As a result, in the five years to 2020, industry revenue is projected to increase at an average annual rate of 2.9% to total \$22.9 billion. The industry is also expected to benefit from an increase in industrial activity, particularly in the Great Lakes region, aided by a rebound in the manufacturing sector.

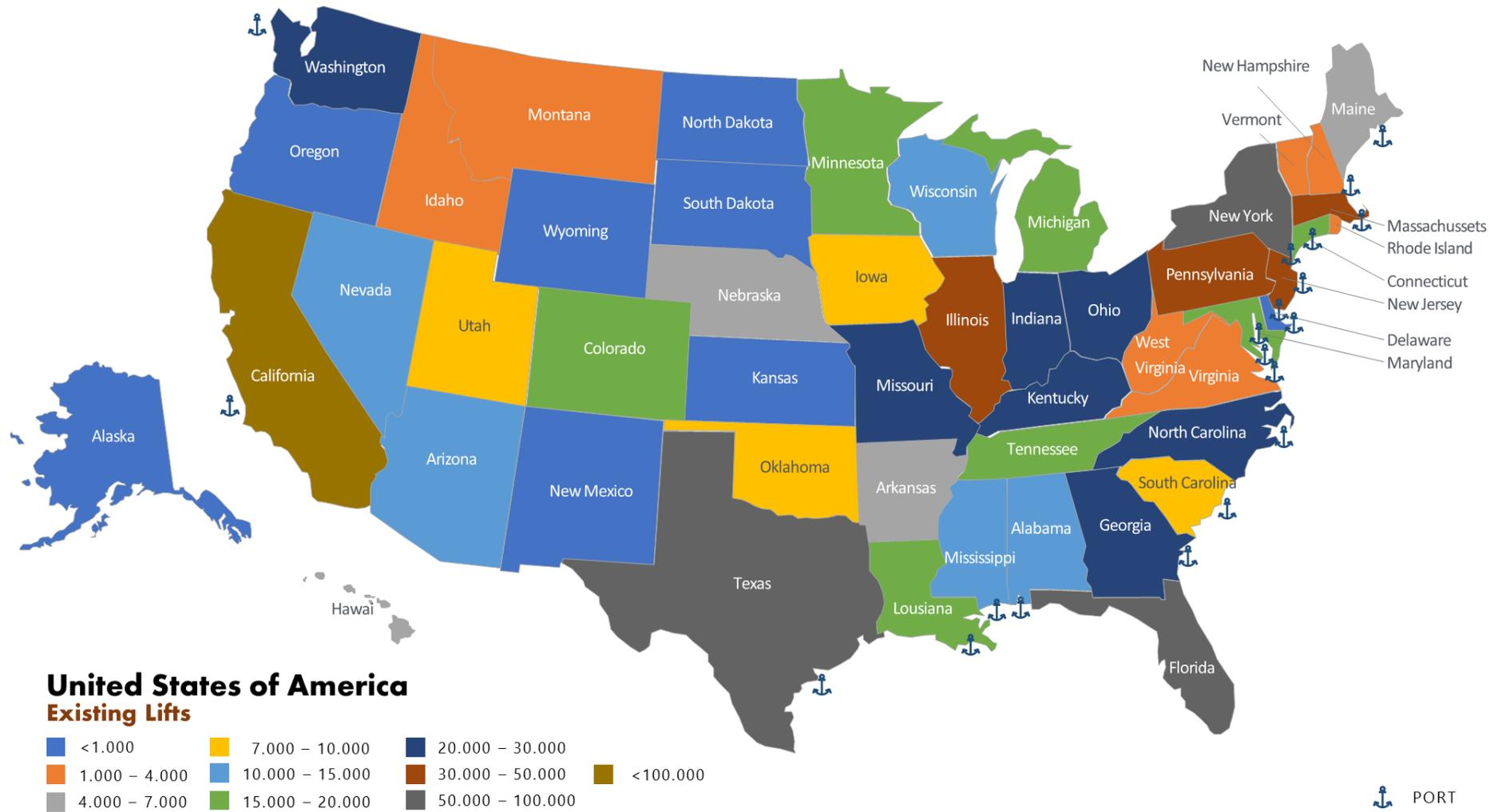
According to Elevator World (2014), California is the larger elevator market in the U.S with over 125k existing lifts and over 8k new lifts. North east coast presents biggest concentration of elevators.

*Table 2: New Lift & Existing Lifts in the U.S (Top Ten States)*

State	New Lifts	State	Existing Lifts
CALIFORNIA	8.841	CALIFORNIA	125.708
TEXAS	2.744	NEW YORK	69.494
NEW YORK	2.500	TEXAS	60.700
MINNESOTA	1.400	FLORIDA	52.578
MASSACHUSETTS	800	MASSACHUSETTS	41.524
MARYLAND	791	PENNSYLVANIA	41.415
KENTUCKY	745	ILLINOIS	34.215
ILLINOIS	732	NEW JERSEY	30.835
GEORGIA	547	KENTUCKY	27.638
TENNESSEE	500	INDIANA	24.820

*Source: Vertical transportation industry profile, Elevator World*

Figure 7: Existing Lifts in the U.S



Source: Vertical transportation industry profile, Elevator World

Figure 8: USA Population Density

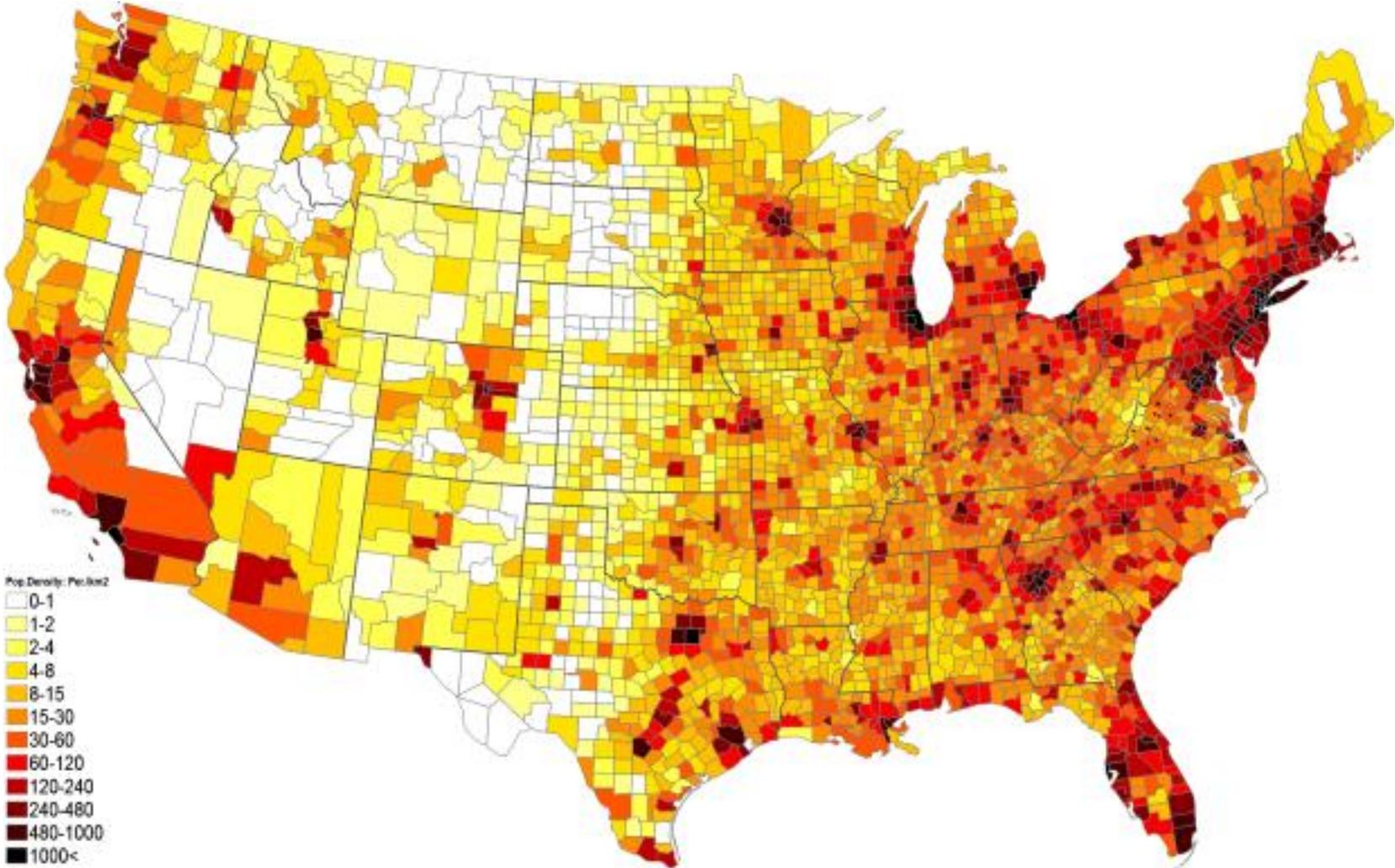


Figure 9: Population Distribution

**The population of the United States** is not distributed evenly. Instead, we tend to bunch up in communities, leaving the spaces in between more sparsely inhabited. Most Americans live in or near cities; today 53 percent live in the 20 largest cities; 75 percent of all Americans live in metropolitan areas.

**This map shows population density. The relative height of each major city reflects its population in 1990.**

Source: U.S. Census Bureau

**Go West.** Nevada is the fastest growing state, followed by Arizona, Idaho, Colorado, and Utah.

**Wyoming** has the lowest population density of all states in the lower 48 with an average of five people per square mile.

**What happens in the empty spaces?** Some of it is farming country. More than one quarter of America's crop land is used to grow corn. One third of what is produced is exported to other countries.

**Chicago, the country's third largest city,** has a population of about three million people. There are 21 states with populations smaller than this city.

**Largest metropolitan area** includes New York City and portions of New Jersey and Long Island with a total population of 20 million.

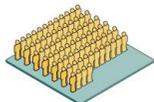
**Population Distribution**

*Where do we live?  
Where don't we live?*

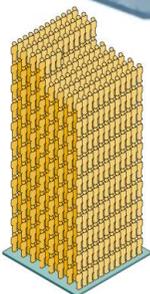
**Population density** is highest in New York City, where there are 23,000 people per square mile.

**Coastal areas** are home to more than half the U.S. population.

**Approximately one in nine Americans** lives in the nation's most populous state—California. More than 15 million people live in the Los Angeles, Riverside, and Orange County metropolitan area.



**Distributing our population evenly** would put an average of 76 people per square mile.



**New Jersey** is the most densely populated state with an average of more than 1,000 people per square mile.



**Alaska** is a sparsely populated state with an average of one person per square mile.

If we compare the above maps, we will see that urbanization in USA is one of the main factors of the elevator industry development.

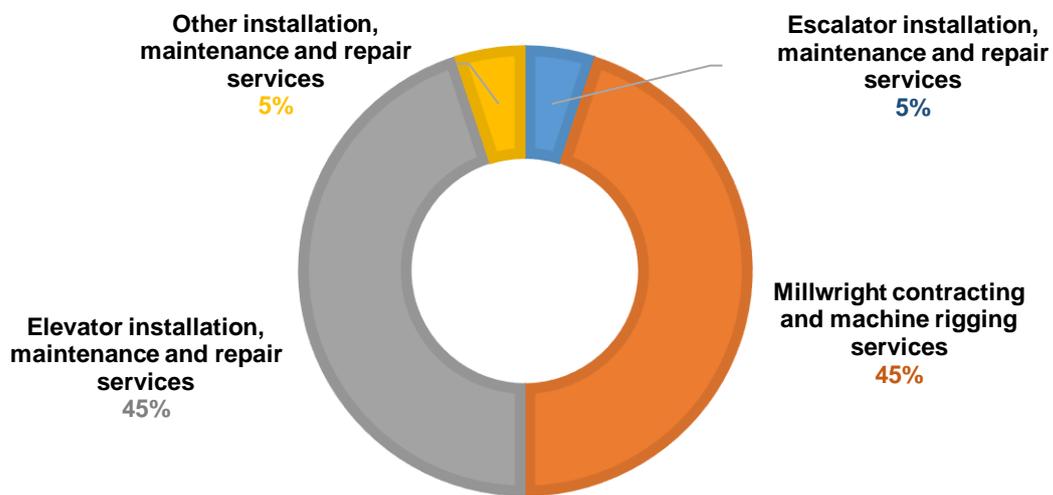
Table 3: Industry Activity (NAEC Members)

Region	% of industry
Southeast	26,1%
Mid-Atlantic	17,7%
Western	13,4%
Great Lakes	15,9%

Source: NAEC

### Products & Services

Figure 10: Products and services segmentation



Total: \$ 19.9bn

Source: Ibisworld

The industry generates the bulk of its revenue (45.0%) from the installation, repair, and maintenance of elevators in buildings across the construction market spectrum. These services are spread primarily between the residential market (e.g. multifamily apartment buildings) and

the commercial market (e.g. office buildings and retail spaces). The installation of elevators typically requires specialist equipment as well as a thorough inventory of parts from the specific elevator manufacturer.

- **New Installations**

Major manufacturing and installation companies dominate this field, using crews in their employ to manufacture and install equipment. In the U.S., many of these companies belong to National Elevator Industry, Inc. (NEII®). Numerous independent contractors also install new equipment and may manufacture some parts, but the bulk of equipment installed is supplied by vendors that manufacture the component parts for installation by the major elevator contractors, as well as independent installation and modernization contractors.

- **Modernization**

Considering the more than 150-year history of elevator installations and rapidly changing technology, vast opportunities exist to upgrade existing installations. Such upgrading occurs annually on an estimated 10% of the existing installations that are more than 20 years of age. Unlike new installations, industry activity of this sort goes unreported, and the extent of this market can only be estimated.

- **Maintenance**

Maintenance of existing equipment is the greatest dimension of the elevator industry. Its participants range from small businesses, maintaining perhaps 50-100 units in a city, to the major manufacturers, with offices in practically every major city, maintaining thousands of elevators with a great number of mechanics – each responsible for as many as 150 or more units. Estimates indicate that maintenance is the primary business of more than 1,500 companies. Many of these companies, particularly those who are not members of NEII®, are members of the National Association of Elevator Contractors (NAEC). Some are members of both associations.

- **Profit growth**

Along with economic recovery and business expansion, increased new construction and accelerated industrial activity will attract new entrants into the industry. However, new

entrants are expected to generate limited competition, so the growing volume of contracts will mean that fewer industry operators will need to slash prices to obtain business. Consequently, the average profit margin, measured as earnings before interest and taxes, is anticipated to rise to 5.4% of revenue by 2020. Additionally, in the next five years, the number of enterprises operating in this industry is expected to increase at an average annual rate of 2.1% reaching 15,389 in 2020. While average industry wages are expected to rise going forward, efficiency gains achieved during the recession are expected to offset this increase. The industry is likely to obtain greater labor efficiencies by arranging periodic maintenance and repair activities to optimize the use of permanent workers on ordinary hourly pay rates. However, the increase in demand from downstream construction markets will encourage industry operators to increase their total labor force. As a result, industry employment expects to grow at an average annual rate off 2.4%, reaching 108,252 workers in the five years to 2020.

## Canada

Canada possessed a stock of ~120,000 passenger and freight elevators in 2016, representing the highest number of installed elevators per urban capita in North America. Canada’s stock of elevators is heavily concentrated in the three main urban centers of Montreal, Toronto and Vancouver. Demand for new passenger and freight elevators totaled over 2,000 units in 2016.

*Table 4: New Lift & Existing Lifts in Canada*

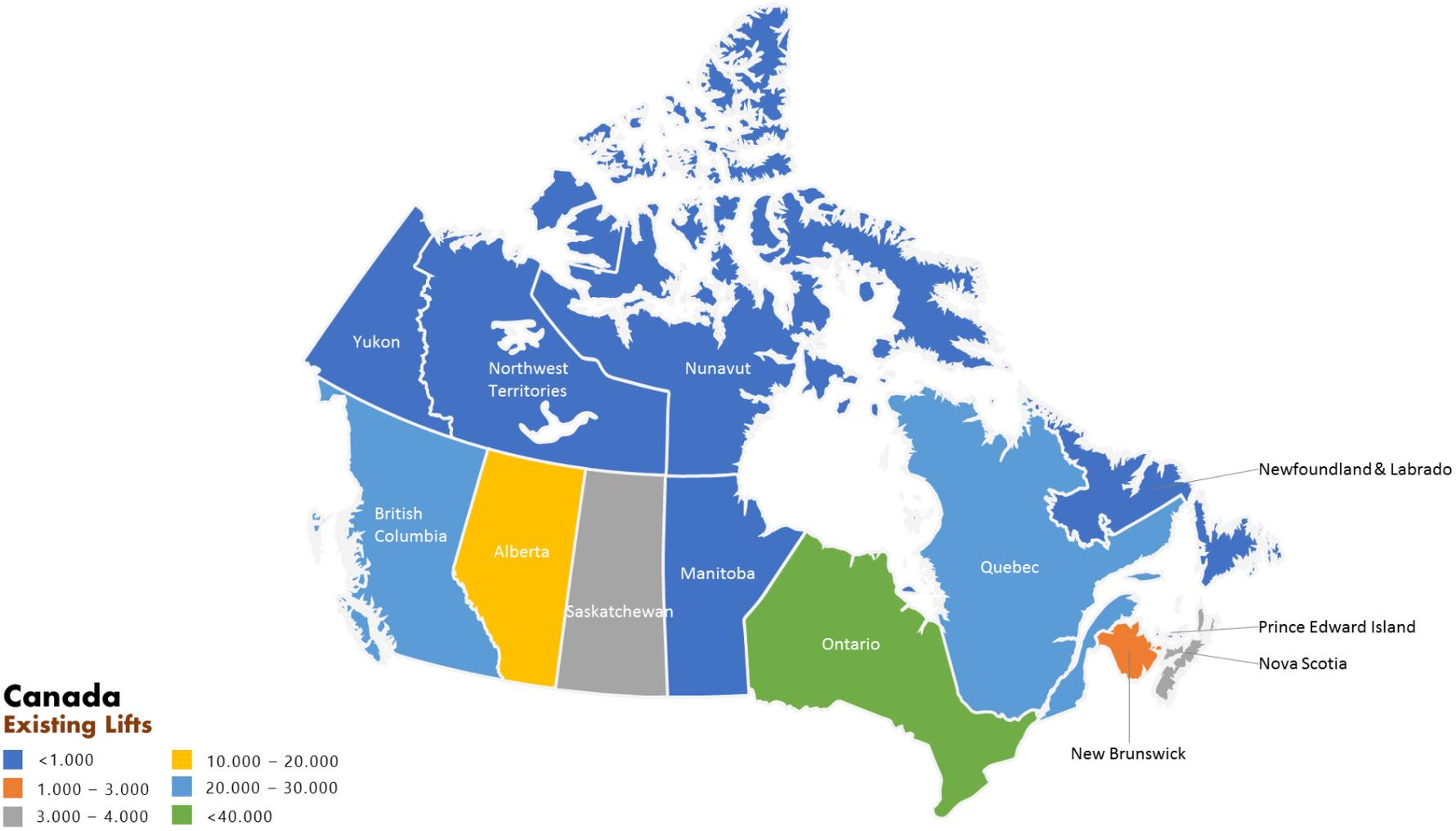
Provinces	New Lifts	Provinces	Existing Lifts
ONTARIO	900	ONTARIO	43.435
BRITISH COLUMBIA	482	ALBERTA	27.112
QUÉBEC	208	SASKATCHEWAN	25.919
ALBERTA	150	NOVA SCOTIA	11.105
NOVA SCOTIA	70	NEW BRUNSWICK	3.800
SASKATCHEWAN	20	PRINCE EDWARD ISLAND	3.486
NEW BRUNSWICK	13	YUKON	1.872

NEW FOUNDLAND AND LABRATOR	2
PRINCE EDWARD ISLAND	
NORTHWEST TERRITORIES	

NORTHWEST TERRITORIES	825
ONTARIO	605
ALBERTA	187

*Source: Vertical transportation industry profile, Elevator World*

Figure 11: Existing Lifts in the U.S



Source: Vertical transportation industry profile, Elevator World

## Elevator Types in North America

Table 5: Elevator Types in North America

Specs	Home / Residential / Private Residence	LULA	Passenger / Commercial
Use	Home use 1 User	Limited persons lifts For Churches, Schools	Public Buildings
Type	Usually Hydraulic	Usually Hydraulic	All Types
Stops	Up to 5	Up to 3	No limit
Load	Popular: 900lb (400kg)	Max 1400lb (630kg) Popular: 1400lb	From 1000lb (450kg) to 5000lb (2270kg) Popular: 2500lb (1135kg)
Max Travel	15m (50ft)	7,6m (25ft)	No limit
Max Speed	0,2m/s (40fpm)	0,15m/s (30fpm)	No limit
Door opening	900mm	Min 915mm	1066mm
Door fire-rating	No – Locking device should be certified	Yes – min 90min	Yes – min 90min
Semi-automatic doors	Allowed	Allowed, but automatic doors is selected	

### Geared Elevators

These traction-type elevators have speeds of 100-450 fpm (0.5-2.25 mps), although some are offered at 500 fpm (2.5 mps). Common in suburban-type office buildings up to 12 floors, the units are also found in residential buildings up to about 25 floors and various low-rise buildings where high-quality service is desired, such as hospitals and government buildings. Generally, the average number of stops per unit can be estimated at 10. The installation cycle is about two years.

## **Hydraulic Elevators**

These are commonly used in low-rise buildings from two floors up to a maximum of five or six. The upper practical speed limit of hydraulic elevators is about 200 fpm (10 mps), with 150 fpm (0.75 mps) being more common. Hydraulic elevators are the dominant equipment used in the elevator marketplace. Therefore, dozens of companies manufacture hydraulic elevator components. They came into prominence during the 1950s, surpassing the formerly prominent geared market. The installation cycle of a hydraulic elevator can be short – comprising months rather than years – therefore making them attractive for the smaller company to install and for use in smaller buildings.

### **3. Construction Outlook**

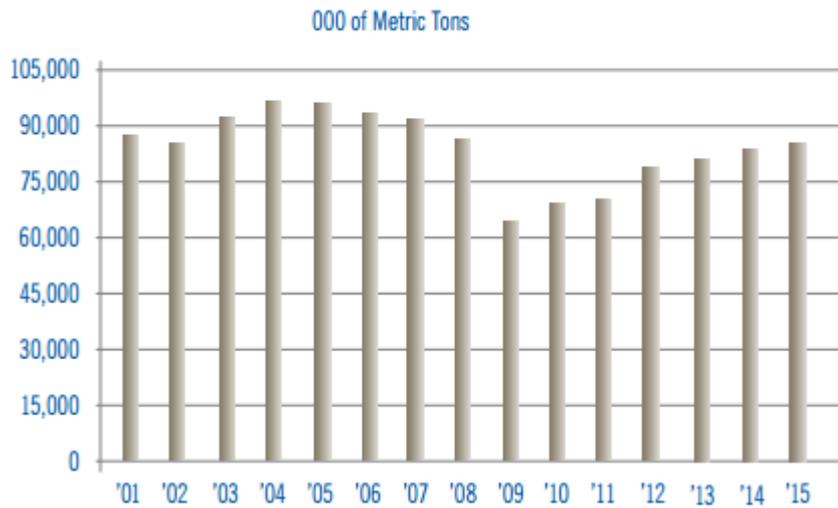
#### **The U.S**

Following contraction since 2006, the US construction industry finally recovered in 2012 and registered a growth rate of 3.5% in real terms. The recovery has continued through to 2015, and is expected to remain in place over the following years (2016–2020), with investment in infrastructure construction, healthcare, manufacturing, educational facilities and housing projects continuing to drive growth. Growth will also be driven by the President’s Climate Action Plan<sup>1</sup>, through which the government aims to increase the share of renewable energy from 10% of total consumption in 2015 to 20% by 2020.

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<sup>1</sup> On the first day of the presidency of Donald Trump, the White House website announced that The Climate Action Plan would be eliminated, stating it is 'harmful and unnecessary'.

Figure 12: Cement Consumption in USA



Source: PCA

Through the America 2050 program, the government plans to develop the country's deteriorating infrastructure to provide a sustainable mobility system to the growing population. It includes the construction of California high-speed rail phase-1, and new intercity rail operations between Merced and the San Fernando Valley by 2022.

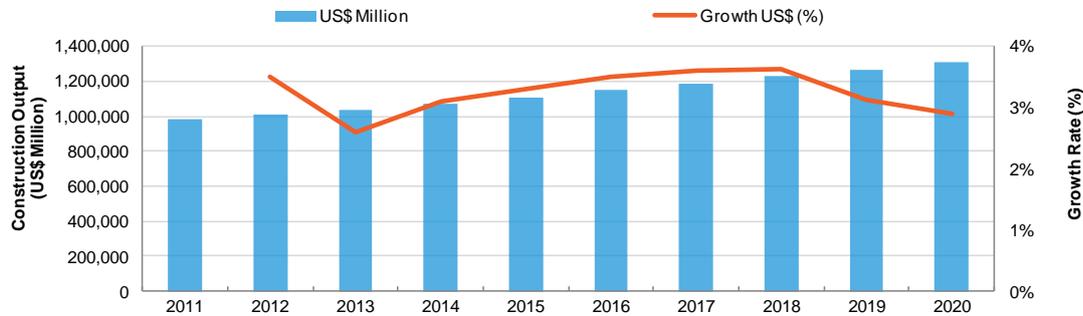
Through affordable housing programs such as the Community Development Block Grants (CDBG), the US Department of Agriculture Housing Assistance program, the Neighbourhood Stabilization Program (NSP) and the Housing Choice Voucher Program, the government aims to build affordable houses for low-and middle-income people.

According to the US Census Bureau, total construction spending remained buoyant in the first seven months of 2016. Total construction spending rose by 8.7%, from US\$1.0 trillion in 2014 to US\$1.1 trillion in 2015. This was preceded by annual growth rates of 8.4%, 11.1% and 6.2% in 2014, 2013 and 2012 respectively. Moreover, it increased by 1.5% in the first seven months of 2016, from US\$1.1 trillion in January–July 2015 to US\$1.2 trillion in January–July 2016.

The industry's output value in real terms is expected to rise at a compound annual growth rate (CAGR) of 3.34% over the forecast period, up from 3.12% during the review period (2011–

2015). The industry is consequently expected to grow from a value of US\$1.1 trillion in 2015 to US\$1.3 trillion in 2020, measured at constant 2010 US dollar exchange rates.

Figure 13: US Construction Output (Real US\$ 2010, Million), 2011–2020



Source: Timetric

Based on Timetric database, there are 5716 open projects requiring a lift solution in USA with time completion until Q4 2019.<sup>2</sup> The regional allocation of open projects is shown below. The majority of the projects are located in North America.

Table 6: Open projects in Timetric database

UP TO Q4 2019		17/02/17	UP TO Q4 2019		17/02/17
North America (6709) <sup>3</sup>	USA.EAST COAST	3486	Europe (3621)	UK	1594
	USA.WEST COAST	2230		GERMANY	556
	CANADA.WEST COAST	609		FRANCE	425
	CANADA.EAST COAST	381		SWITZERLAND	189
	INDIA	732		POLAND	157

<sup>2</sup> Project Stage: Announced, Study, Planning, Pre- Design, Design, Pre- Tender, Tender, EPC Award, Execution  
 Type: Both Primary & Secondary  
 Sector: Leisure & Hospitality Buildings, Office Buildings, Retail Buildings, Institutional, Residential Buildings  
 Extraction Date:17/02/2017

<sup>3</sup> Does not affected by standard EN 81.20

CHINA	566	IRELAND	86
MALAYSIA	550	BELGIUM	70
RUSSIA	491	AUSTRIA	62
THAILAND	179	NORWAY	55
PHILIPPINES	135	ROMANIA	54
SINGAPORE	126	SWEDEN	53
INDONESIA	104	SPAIN	44
MEXICO	85	NETHERLANDS	39
HONG KONG	82	DENMARK	36
TURKEY	69	ITALY	33
		FINLAND	27
		PORTUGAL	24
		LUXEMBURG	19
		CZECH	17
		REPUBLIC	

## 1. Residential Construction

Residential construction was the largest market in the US construction industry, accounting for 36.7% of the industry's total value in 2015. The market recorded a review-period nominal CAGR of 10.64%, increasing from US\$316.5 billion in 2011 to US\$474.3 billion in 2015.

According to the National Association of Realtors (NAR), total sales of residential buildings in the country rose by 6.3%, from 59.1 million in 2014 to 62.8 million in 2015. In the first five months of 2016, sales increased by 4.9% from 25.6 million in January–May 2015 to 26.8 million in January–May 2016.

The government plans to provide financial assistance through the Home Investment Partnerships Program to states and localities that buy, build or reconstruct houses in partnership with local non-profit organizations to provide houses to low- and middle-income people at affordable rents. The government will provide a maximum of US\$3.0 million to states for the project. In addition, social housing programs such as the CDBG, NSP, Housing

Opportunities for Persons with AIDS (HOPWA) Program, and Project-based Rental Assistance Program are expected to support forecast-period growth.

The government plans to spend US\$20.9 billion through the Project-based Rental Assistance Program to build 10,000 new housing units by 2017. Under the CDBG program, the government plans to invest US\$2.8 billion to address housing issues in local communities. In addition, it plans to spend US\$335 million on the HOPWA program by 2017.

State governments also focus on developing affordable houses for middle- and low-income people. In the 2016–2017 budget, the California government approved the By Right housing law, allowing local authorities to provide right-to-build multi-family housing with a condition to build 20% of houses for low- and middle-income people. The California government also allocated US\$400 million for affordable housing by 2020.

The market output expected to record a forecast-period CAGR of 6.46% in nominal terms, to value US\$648.6 billion) in 2020.

## **2. Commercial Construction**

Commercial construction was the third-largest market in the industry, accounting for 15.3% of the industry's total value in 2015. The market registered a review-period CAGR of 9.96% in nominal terms, to value US\$197.5 billion in 2015. Growth was supported by rising demand for retail, office and leisure and hospitality buildings because of rises in income levels, retail sales and tourist arrivals. According to the US Census Bureau, the total value of non-residential construction put in place rose by 6.6% from US\$630.8 billion in 2014 to US\$672.2 billion in 2015.

The commercial construction market is expected to be supported by rising retail sales values. According to the US Census Bureau, total retail sales rose by 1.6% from US\$4.6 trillion in 2014 to US\$4.7 trillion in 2015. Moreover, total retail sales increased by 2.7% in the first half of 2016, from US\$2.27 trillion in January–June 2015 to US\$2.33 trillion in January–June 2016. This was preceded by annual growth rates of 4.0%, 3.6% and 4.9% in 2014, 2013 and 2012 respectively.

US commercial property is becoming a lucrative short-term investment option for foreign and domestic investors, as the country's property prices are rising despite global economic

sluggishness. In addition, government initiatives such as tax benefits and discounts on large investment amounts, coupled with low interest rates, are attracting investment in commercial property.

According to the US Census Bureau, total construction spending in commercial buildings rose by 6.5% from US\$62.8 billion in 2014 to US\$66.9 billion in 2015. Total spending on commercial construction rose by 11.0% in the first seven months of 2016, from US\$37.1 billion in January–July 2015 to US\$41.2 billion in January–July 2016.

The market is expected to record a forecast-period CAGR of 6.83% in nominal terms, to value US\$274.8 billion in 2020.

### **3. Industrial Construction**

Industrial construction, which accounted for 5.3% of the total industry value in 2015, was the smallest market in the US construction industry during the review period. Market output rose from US\$38.9 billion in 2011 to US\$69.0 billion in 2015, at a nominal review-period CAGR of 15.42%. This was due to increases in industrial production and manufacturing activity in the country.

However, with a strong US dollar, global demand for US-manufactured goods is falling, resulting in falling exports. Additionally, capital investment in the US commodity manufacturing sector is decelerating due to low global commodity prices. Consequently, over the forecast period, the industrial construction market is expected to grow more slowly than during the review period.

Although the outlook for the industrial construction market is expected to be weaker than during the review period, government programs such as the Hollings Manufacturing Extension Partnership (MEP) initiative, the Investing in Manufacturing Communities Partnership (IMCP) program, the Materials Genome Initiative (MGI), and the Advanced Manufacturing Technology Consortia (AMTech) program to increase the US's competitiveness in advanced manufacturing will provide support to forecast-period growth. In addition, a government plan to bring manufacturing companies back to the US from overseas by providing tax rebates and financial support under the reshoring initiative is expected to provide impetus to growth over the forecast period.

Under the AMTech program, the government plans to invest US\$7.8 million to enhance manufacturing facilities in the country by 2020. Moreover, through the Manufacturing USA program, the government plans to build six new manufacturing innovation institutions by 2017, to increase industrial competitiveness and support economic growth.

In January 2016, the government merged the AMTech program with the Manufacturing USA program to provide technical and financial assistance to manufacturing companies in a single program. Consequently, in June 2016, Shell Chemical Appalachia LLC (Shell) announced plans to build new petrochemical complex in the country with a capacity of 1.6 million tons of polyethylene per year by 2025. In August 2016, Fresenius Kabi announced plans to invest US\$250.0 million to construct a new generic injectible medicine production plant by 2026

The market is expected to register a forecast-period CAGR of 6.99% in nominal terms, to value US\$96.7 billion by 2020.

#### **4. Institutional Construction**

Institutional construction was the fourth-largest in the US construction industry, accounting for 12.9% of its total value in 2015. The market recorded a review-period CAGR of -1.40% in nominal terms, declining from US\$176.8 billion in 2011 to US\$167.1 billion in 2015. This decline can be attributed to government efforts to reduce the budget deficit, and the economic slowdown during 2011–2012.

The government's investment on healthcare and education are expected to support the institutional construction market's growth over the forecast period. Government spending on Medicare and the health sector, as a percentage of total budget spending, rose from 27.4% in 2015 to 28.0% in 2016. Consequently, total spending on Medicare and health grew by 6.9% from US\$935.8 billion in 2015 to US\$1.0 trillion in 2016. Moreover, total spending on the education sector grew by 5.3% from US\$81.4 billion in 2015 budget to US\$85.7 billion in 2016 budget.

The government aims to develop healthcare infrastructure in rural areas of the country, as one-quarter of the population lives in rural areas. The government plans to invest US\$16.0 million in various rural healthcare programs, including US\$6.3 million in the Telehealth Network Grant program, US\$4.1 million in the Small Health Care Provider Quality Improvement

program, and US\$900,000 in the Flex Rural Veterans Health Access program by 2019. The government has also allocated US\$4.9 million to rural health research centers, to improve health and living conditions in rural communities by 2020.

Timetric expects market output to record a forecast-period CAGR of 4.37% in nominal terms, to value US\$207.0 billion in 2020.

## **Canada**

Construction activity in Canada was weak in 2015, with the industry's output contracting by 1.7% in real terms, as a result of slow economic growth, low oil prices, a decrease in public spending and high unemployment rates. This followed respective annual growth in real terms of 7.7%, 2.1% and 1.4% in 2012, 2013 and 2014.

The industry's forecast-period outlook is relatively moderate compared to its review-period performance. The industry's output value is expected to grow at a forecast-period CAGR of 2.13% in real terms – down from 2.29% during the review period.

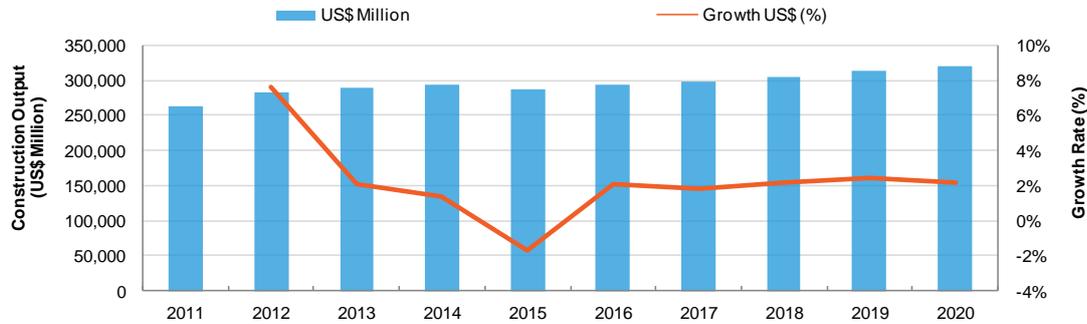
According to Statistics Canada, the seasonally adjusted industry's value add at constant prices decreased by 3.0%, going from CAD121.7 billion (US\$110.0 billion) in 2014 to CAD118.0 billion (US\$92.8 billion) in 2015. This was preceded by respective annual growth of 1.4% and 2.1% in 2014 and 2013.

Over the forecast period, industry growth will be supported by investments in residential and commercial buildings construction, as well as improvements in consumer and investor confidence. The government's focus on the development and modernization of public infrastructure across the country through public-private partnerships (PPPs) will support industry growth.

Growing population and urbanization, and improvements in domestic manufacturing activities will continue to drive growth in the industry over the forecast period. In addition, the government's efforts to enhance the residential and public infrastructure will support growth in the industry. With an aim to provide affordable housing to the lower- and middle-class population, the government is planning to spend CAD7.8 billion (US\$6.0 billion) in social infrastructure by 2020. This investment includes expenditure on renovation and new housing buildings construction.

The Canadian construction industry is expected to reach a nominal value of CAD416.3 billion (US\$329.7 billion) in 2020; up from CAD349.5 billion (US\$265.2 billion) in 2015.

Figure 14: Canadian Construction Output (Real US\$ 2010, Million), 2011–2020



Source: Timetric

Based on Timetric database, there are 609 open projects requiring a lift solution in Canada with time completion until Q4 2019.<sup>4</sup>

### 1. Residential Construction

Accounting for 37.0% of the industry’s total value in 2015, residential construction was the largest market in the Canadian construction industry during the review period. It registered a review-period CAGR of 4.59% in nominal terms, to value CAD125.0 billion (US\$98.3 billion) in 2015. This growth was driven by the multi-family housing construction category, which accounted for 45.3% of the market’s value in 2015, recording a review-period CAGR of 6.64%. Single-family housing contributed the remaining 54.7%, and recorded a nominal review-period CAGR of 3.03%.

The government, in collaboration with the Canada Mortgage and Housing Corporation (CMHC) and Canada Infrastructure Bank, has been providing finance and support to construct

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<sup>4</sup> Project Stage: Announced, Study, Planning, Pre- Design, Design, Pre- Tender, Tender, EPC Award, Execution  
 Type: Both Primary & Secondary  
 Sector: Leisure & Hospitality Buildings, Office Buildings, Retail Buildings, Institutional, Residential Buildings  
 Extraction Date:17/02/2017

affordable rental housing for lower- and middle-income groups. Under the AHI initiative, the government allocated CAD1.4 billion (US\$1.4 billion) in 2011 to provide affordable homes to the lower- and middle-income population across all provinces, including Ontario, Nunavut, Alberta and British Columbia, until 2014. In Ontario, CMHC implemented various affordable housing programs by investing CAD480.6 million (US\$485.7 million) during 2011–2015. These programs included the Home Ownership program, which provided down payment assistance for purchasing new affordable houses; the Rent Supplement Component program, under which rent was paid to landlords, on behalf of households in need of rental assistance; the Housing Allowance Component program, under which payments were directly made to renters facing housing affordability issues; and the Ontario Renovates program, under which forgivable loans were granted to landlords and homeowners for major renovations and repairs.

According to Statistics Canada, the total investment in new housing construction in the country grew by 2.7% in real terms, going from CAD42.9 billion (US\$38.8 billion) in 2014 to CAD44.1 billion (US\$34.7 billion) in 2015. This was preceded by an annual average increase of 1.2% in 2014. However, investment in new housing construction varied across categories in 2015; the multi-family category recorded the largest increase, as investment in apartments rose by 15.0%, compared to a decline in prices for the single-family housing category, as investment in single houses declined by 3.2%. The investment in new housing construction in Nova Scotia province grew by 20.3% in 2015, compared to the previous year, while investment in new housing in Prince Edward Island and British Columbia rose by 15.2% and 13.6% respectively.

Review-period growth was supported by low interest rates, the expanding middle-class population, an increase in the influx of foreigners into the country and the government's efforts to maintain a balance between supply and demand for housing.

The residential construction market is expected to be the industry's second-fastest-growing market over the forecast period, with an expected CAGR of 5.07% in nominal terms, to value CAD160.0 billion (US\$126.8 billion) in 2020.

## **2. Commercial Construction**

During the review period, commercial construction was the third-largest market in the Canadian construction industry, accounting for 8.5% of the industry's total value in 2015. The

market registered a review-period CAGR of -1.05% in nominal terms, to value CAD28.8 billion (US\$22.6 billion) in 2015. This decline can be attributed to weak business confidence and consumer demand, which resulted in low investment in the construction of commercial buildings during the review period.

Over the forecast period, the market is expected to register positive growth, driven by improvement in investor confidence, a rise in retail sales and the growing influx of tourists into the country.

According to Statistics Canada, the total value of retail sales grew by 2.2% in 2015, going from CAD505.0 billion (US\$397.0 billion) in 2014 to CAD516.0 billion (US\$466.5 billion) in 2015. This was preceded by an annual growth of 4.6% in 2014. This upward trend will improve confidence in the retail sector, and contribute to a positive outlook for the commercial construction market over the forecast period.

According to Statistics Canada, the country's seasonally adjusted total tourism expenditure grew by 3.2% at constant prices, going from CAD58.5 billion (US\$52.9 billion) in the first three quarters of 2014 to CAD60.4 billion (US\$47.5 billion) in the first three quarters of 2015. According to Destination Canada, the country's tourism marketing organization, the total foreign tourist arrivals grew by 7.5% in 2015 as compared to 2014, suggesting that the demand remains positive.

The office buildings category will also support growth in the market over the forecast period. Ivanhoe Cambridge, Inc., Metrolinx and Hines Interests Ltd plan to construct an office and transit complex on an area of 280,000m<sup>2</sup> in Toronto. It involves the construction of two office towers, a bus terminal, a 0.4ha sky park connecting the two buildings, parking and related facilities. The total investment is anticipated to value CAD2.1 billion (US\$1.9 billion), and work is scheduled to be completed by the end of 2019.

With an expected investment of CAD1.4 billion (US\$1.3 billion), Brookfield Office Properties is undertaking the office complex development in Calgary, Alberta. It involves the construction of an office complex comprising two high-rise office towers on a 22ha area, and is expected to be completed by the end of 2021.

It is expected that the market output will post a forecast-period CAGR of 2.62% in nominal terms, to value CAD32.8 billion (US\$25.9 billion) in 2020.

### **3. Industrial Construction**

Industrial construction was the second-smallest market in the Canadian construction industry during the review period. It accounted for 6.1% of the industry's total output and valued CAD20.5 billion (US\$16.1 billion) in 2015, following a review-period CAGR of 9.64% in nominal terms.

The market contracted by 2.0% in 2015, as a result of a decrease in building permits and the low investment in industrial construction. According to Statistics Canada, the seasonally adjusted total value of building permits for non-residential construction decreased by 6.3%, going from CAD33.9 billion (US\$30.6 billion) in 2014 to CAD31.8 billion (US\$25.0 billion) in 2015. Moreover, investment in industrial buildings construction decreased by 19.2%, going from CAD1.9 billion (US\$1.7 billion) in the fourth quarter of 2014 to CAD1.5 billion (US\$1.2 billion) in the fourth quarter of 2015.

However, the market is expected to expand over the forecast period, driven by the government's implementation of the Made in Canada program in 2014. Under this program, the government plans to transform the country into a manufacturing hub. Accordingly, the government announced the extension of the accelerated capital cost allowance (CCA) until 2025. CCA enables manufacturers to avail write-offs on infrastructure upgrades and new equipment. Moreover, the government announced it was to charge 9.1% as a marginal effective tax rate for new investment in manufacturing in 2016, which is relatively lesser than 26.4% and 31.7% in Germany and the US respectively.

The market is expected to post a forecast-period CAGR of 4.10% in nominal terms, to value CAD25.1 billion (US\$19.9 billion) in 2020.

### **4. Institutional Construction**

Institutional construction was the smallest market in the Canadian construction industry during the review period. It accounted for 5.9% of the industry's total value in 2015, and posted a review-period CAGR of -0.66% in nominal terms, to value CAD20.0 billion (US\$15.7 billion) that year. This decline can be attributed to the economic slowdown, which resulted in low investment in the institutional construction market.

The government introduced Canada's International Education Strategy in 2014 in the aim to represent the country as a global leader in international higher education, under which the

government plans to attract over 450,000 global researchers and students to Canada by 2020. Through the program, the government aims to enhance research links among local and foreign educational institutions, for establishing a pan-Canadian association with territories and provinces, as well as all major participants, including the private sector. Accordingly, it plans to invest CAD5.5 million (US\$5 million) per year through 2020, to market and brand Canada as the highly preferred education destination for students in various countries, including Mexico, Vietnam, Brazil, the Middle East, China, North Africa and India.

The government of Ontario plans to invest CAD11.4 billion (US\$10.3 billion) on the construction of new healthcare facilities and renovation of the existing hospital infrastructure across the province by 2024. Moreover, the government will invest CAD700.0 million (US\$632.9 million) on major healthcare infrastructure repairs that had been deferred to avoid immediate costs. In addition, the government plans to invest CAD300.0 million (US\$271.2 million) on the improvement of the community healthcare infrastructure, which includes nurse practitioner-led clinics and community health centers. The government will also invest CAD11.8 billion (US\$10.7 billion) in the development of educational infrastructure, until 2024, which includes the construction and renovation of school buildings, colleges, universities and research facilities.

It is expected that the market to register a nominal forecast-period CAGR of 4.98%, to value CAD25.5 billion (US\$20.2 billion) in 2020.

## **4. Drivers, Challenges & Trends**

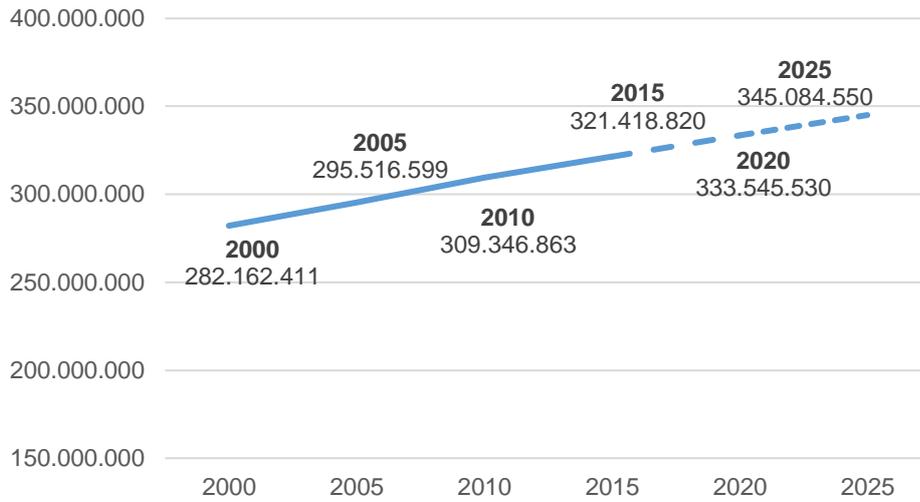
### **4.1 Drivers**

#### **The U.S**

##### **Population & Urbanization**

According to the United Nations Department of Economic and Social Affairs (UNDESA), the total population of the US is expected to increase by 11.5% from 309.3 million in 2010 to 345.0 million by 2025. This growth is expected to increase demand for housing over the following years.

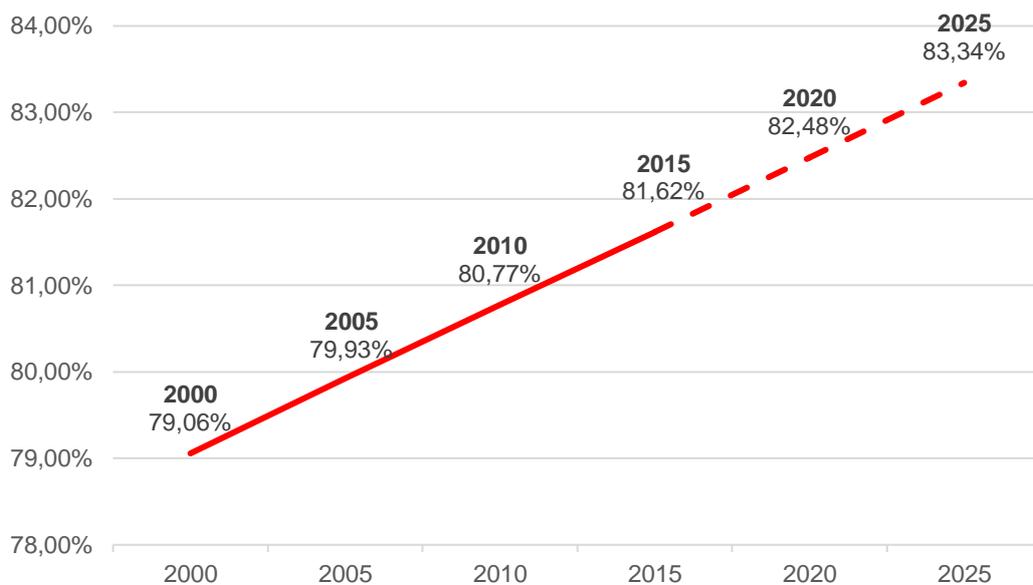
Figure 15: Total Population USA



Source: United Nations Statistical Division

The market is also expected to be supported by the country's rising urbanization over the following years. According to the UNDESA, the US urban population as a percentage of the total population rose from 80.8% in 2010 to 81.6% in 2015, and is expected to reach 82.5% in 2020 and 83.3% by 2025. This will create fresh demand for residential construction over the next years.

Figure 16: Urbanization Rate USA



Source: United Nations Statistical Division

## **Value of private non-residential construction**

The majority of industry revenue is derived from the installation and maintenance of building equipment and machinery in nonresidential buildings. This mainly includes the installation of elevators and other building machinery in multistory office buildings, other commercial buildings and manufacturing and industrial buildings. Therefore, this industry is sensitive to fluctuations in nonresidential construction. The value of private nonresidential construction is expected to increase over the following years, providing a potential opportunity for the industry.

## **Housing starts**

The installation of elevators in multistory residential buildings, such as apartments and condominiums, form a large component of industry revenue. Therefore, this industry is sensitive to cyclical fluctuations in multifamily residential construction.

## **Standards**

An elevator is a device to carry passengers and/or freight from one level to another. Such a clear definition is a necessity to distinguish elevators from hoists and cranes, and both the legal profession and tradition have served to narrow and better define an “elevator.” The current, legally accepted definition can be found in the American Society of Mechanical Engineers A17.1-2013/CSA B44-13 Safety Code for Elevators and Escalators.

Consensus codes are generally written as mandatory, while standards are written as recommendations. They are referred to as model codes and standards. Model codes and standards are not enforceable unless adopted by an AHJ. In the U.S building transportation industry, the most widely used model codes and standards documents are the Safety Codes for Elevators and Escalators, ASME A17.1/CSA B44; Performance-Based Safety Code for Elevators and Escalators, ASME A17.7/CSA B44.7; Guide for the Inspection of Elevators, Escalators and Moving Walks, ASME A17.2; Safety Code for Existing Elevators and Escalators, ASME A17.3; Standard for Elevator and Escalator Electrical Equipment, CSA-B44.1/ ASME A17.5; Standard for Elevator Suspension, Compensation, and Governor Systems, ASME A17.6; Guide for Emergency Personnel, ASME A17.4; Standard for the Qualifications of Elevator Personnel, ASME QEI - 1; and Safety Standard for Platform Lifts and Stairway Chairlifts, ASME A18.1. Additionally, ASME publishes the ASME A17.1/CSA

B44 Handbook by Edward A. Donoghue, CPCA, which clarifies and explains the code requirements.

The ASME A17.1 and CSA B44 Codes were harmonized in 2000 and published as the Safety Codes for Elevators and Escalators, ASME A17.1/ CSA B44, starting with the 2007 edition. The latest edition of ASME A17.1/ CSA B44 is the 2013 edition. The harmonized the U.S and Canadian Performance-Based Safety Codes for Elevators and Escalators, ASME A17.7/CSA B44.7 was published in 2007.

As the world becomes smaller and smaller, international standards will play an important role in future. ISO 9000, as an example, is a standard series on quality system registration and related issues that has become very popular. Multinationals are pushing towards to the implementation of a global standard for elevators in order to minimize production costs and dominate the market through price reduction.

### **Technical Education**

With the rapid technological advances in the elevator industry, education of its members has taken on a new importance. Seminars and training sessions are held around the U.S. and the world, and the industry now has the prestige of a postgraduate degree available in the field of lift engineering.

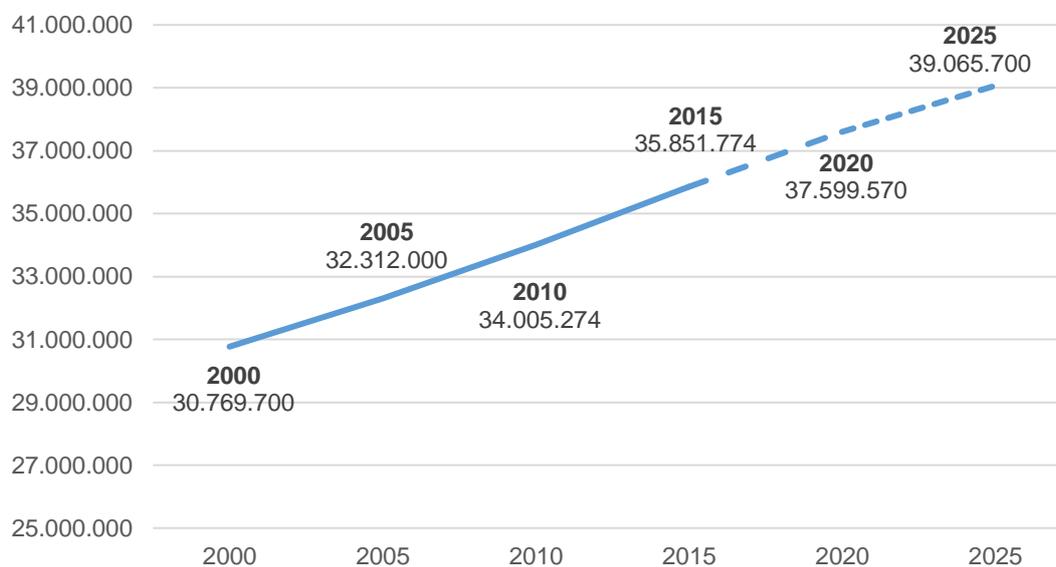
Over a nine-year period, NAEC developed a program to educate and certify elevator technicians (CET®) and those working on accessibility equipment (CAT®). These are four- and two-year programs, respectively. NAESA International and the Elevator Industry Work Preservation Fund (EIWPF) conduct courses to educate inspectors in code knowledge, which can lead to QEI certification. In addition, the IUEC, in concert with NEII®, has an education program for union members produced and instructed through National Elevator Industry Educational Program. Most major companies have specialized training for their mechanics. A major training effort has been undertaken in New York City. Here, the local contractors employing IBEW Elevator Division members sponsor a Joint Apprentice Training Program featuring informative classroom and shop study. They cooperate with the local school administrators to sponsor a vocational, high-school elevator mechanic training program.

## Canada

### Population & Urbanization

The market will be supported by the country's rising population, urbanization and positive developments in regional economic conditions. According to UNDESA, the country's population grew by 5.1%, going from 34 million in 2010 to 35.9 million in 2015, and is expected to reach 37.6 million in 2020 and 39 million by 2025.

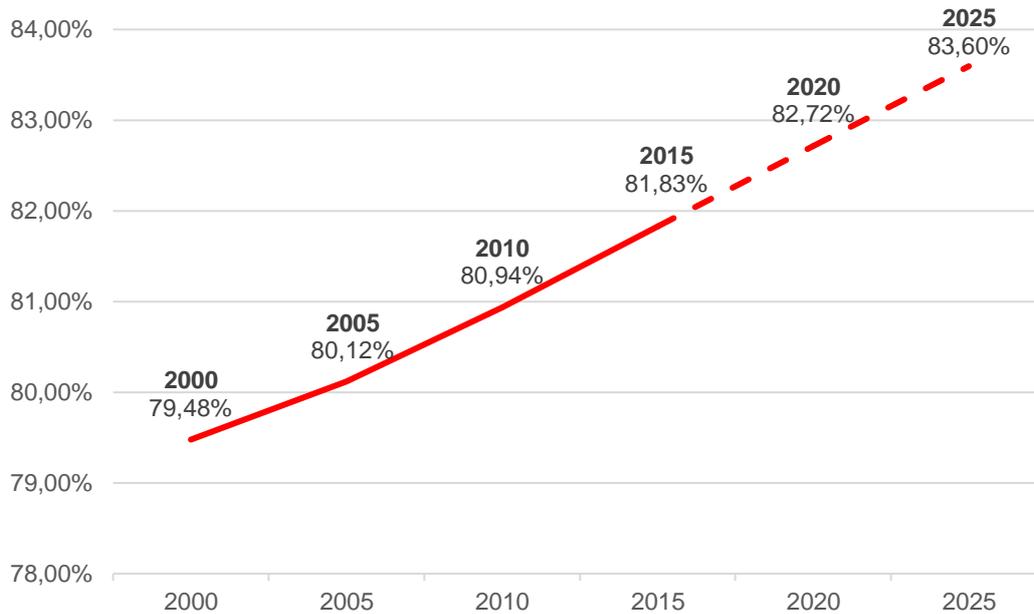
Figure 17: Total Population Canada



Source: United Nations Statistical Division

The country's urban population grew by 6.3%, going from 27.6 million in 2010 to 29.4 million in 2015, and is expected to reach 31.1 million in 2020 and 34.3 million by 2030. The country's growing population and urbanization will create fresh demand for residential construction over the next years.

Figure 18: Urbanization Rate Canada



Source: United Nations Statistical Division

## Standards

The CSA B44 and ASME A17.1 Codes were harmonized in 2000, and since 2007 they have been published as the Safety Codes for Elevators and Escalators, ASME A17.1/CSA B44. The Canadian and the U.S Performance-Based Safety Codes for Elevators and Escalators, ASME A17.7/CSA B44.7 is also a harmonized code. Other documents of interest to the Canadian elevator industry include Lifts for Persons with Physical Disabilities; CSA-B355; Private Residences Lifts for Persons with Physical Disabilities; CSA-B613; and Canadian Electrical Code, CSA C22.1.

As the world becomes smaller and smaller, international standards will play an important role in future. ISO 9000, as an example, is a standard series on quality system registration and related issues that has become very popular. Multinationals are pushing towards to the implementation of a global standard for elevators in order to minimize production costs and dominate the market through price reduction.

## High Rise

High Rise Elevators represent a substantial portion of lift in urbanization areas of import lifts market (over 15 stops). In North America, tall-building construction is spreading beyond the

confines of city centres, such as in New York City (NYC), where towers are taking shape in Brooklyn and Queens, and Toronto, where the suburb of Mississauga is developing a reputation all its own. Mississauga's new landmarks include the Absolute World Towers pair of 158-m-tall, 50-story, twisted residential towers (similar to Turning Torso in Malmö, Sweden) that have aimed international acclaim and redefined the Mississauga skyline. NYC's reputation as king of North American skyscraper construction has been in place since the early 1900s, and that shows no signs of changing anytime soon.

## **4.2 Challenges**

### **The U.S**

#### **Expensive Raw Material**

China is reducing its steel production by 20%. This cause demand to outweigh supply for the first time in over a decade. This is expected to cause a sharp rise in steel prices during 2017 and lasting thru at least 2020.

#### **Yield on 10-year Treasury note**

This industry is sensitive to movements in long-term interest rates. When interest rates rise, investment in new construction drops. As a result, demand for the installation of new equipment and the contracting of related services decreases. The yield on 10-year Treasury notes is expected to increase in 2015, resulting in a potential threat for industry operators.

#### **Safety**

The U.S. Consumer Product Safety Commission (CPSC) has undertaken efforts to report escalator and elevator accidents. These reports are extrapolated from data received from various hospital emergency rooms throughout the country. Statistical sampling projections made from that report indicate that as many as 14,500 elevator and escalator accidents may occur each year. However, when compared to the many billions of elevator trips taken each year, this is a very small proportion. Analysis of the various reports confirms that the causes are mainly the following:

- Persons entering or leaving elevators being struck by doors
- Persons tripping as they enter or leave a car due to the difference between the car floor level and that of the landing
- Persons attempting to enter a hoistway when the car is not there or trying to leave a stalled elevator without assistance

NEII® commissioned an independent consulting firm to study escalator step/skirt performance to help mitigate side-of-step entrapment. The preliminary report was completed in 1999 and has led to a continuing study. This is part of an effort to share the extensive amount of industry research that has been and continues to be conducted to ensure escalator safety. This and future NEII studies were provided to the CPSC, ASME and the A17 Code committees to help develop both safety and code criteria intended to minimize the potential for skirt-to-step entrapment, as well as other possible accidents.

The completion of this study resulted in the incorporation into the A17 code of escalator step/skirt performance parameters and means for measuring compliance with these regulations.

## **Canada**

### **Market concentration on bigger cities**

Canadian elevator market is concentrating in bigger cities like Toronto, Montreal, Ottawa etc. This results that the competition is strong and profit rates are low. Industry consolidation squeezes out smaller players, leaving an “oligarchy” running business.

### **Modernization & Maintenance**

Canadians across the country are finding themselves trapped in faulty elevators, while countless more are suffering through inconvenience and isolation because of elevators that are out of service—and the problem is worsening.

Last year, for example, firefighters in Ontario alone responded to 4,461 calls to extricate people from elevators—more than a dozen a day—and double the number from 2001.

Among cities, Toronto led the way last year with about 2,862 elevator-rescue calls to 911, but others also had their share of problems. For example, Montreal firefighters responded to 1,532 such calls, Vancouver responders went to 428 calls, while Ottawa saw 314 in 2014.

The steep rise in problems is partly the result of more elevators—Ontario has seen a 10 per cent increase over the past five years. But the real culprits, are aging equipment and structural issues within an industry dominated by four huge multinationals: Otis, Schindler, Kone and ThyssenKrupp.

Thirty years ago, a technician would typically service about 35 to 45 elevators for about \$1,000 per elevator a month. The maintenance contract included everything needed to keep the elevators humming—excluding extraordinary events such as flooding or vandalism. Nowadays, the same contract might be worth about \$600—with each technician responsible for 100 elevators.

Rental-apartment landlords, faced with a constant cycle of repairs, are being forced into elevator modernization that can cost between \$150,000 and \$300,000 each—and keep the lift out of service for months. The expense, he said, can only be partly recovered from residential tenants over several years.

About 1,550 of Ontario's 18,000 residential building elevators are more than 50 years old and another 10,000 are between 25 and 50 years old. But even those shiny elevators in new condo buildings are not immune from outages.

The (big) elevator companies do not service the elevators as well as a smaller company, or as well as they used to. Usually, spare parts are shipped from China and expected to arrive in Canada by next week, but this is not what always happens. The delivery time extends to next month. Some of the most problematic elevators in the country are found in Toronto's public housing buildings, many of them high-rise.

Ontario's regulator has mandated the upgrading of single-speed elevators typically found in buildings of three to five storeys. That will increase demand for technicians and equipment, force landlords to dig into their pockets.

## **4.3 Trends**

### **The U.S**

#### **High Rise**

High Rise Elevators represent a substantial portion of lift in urbanization areas of import lifts market (over 15 stops). In North America, tall-building construction is spreading beyond the confines of city centres, such as in New York City (NYC), where towers are taking shape in Brooklyn and Queens, and Toronto, where the suburb of Mississauga is developing a reputation all its own. Mississauga's new landmarks include the Absolute World Towers pair of 158-m-tall, 50-story, twisted residential towers (similar to Turning Torso in Malmö, Sweden) that have aimed international acclaim and redefined the Mississauga skyline. NYC's reputation as king of North American skyscraper construction has been in place since the early 1900s, and that shows no signs of changing anytime soon.

#### **MRL elevators**

Machines that are used in the lower speed range are typically mounted in the hoistway in what has become known as the MRL configuration. Many thousands of MRL elevators have been installed throughout Europe in recent years. The acceptance of MRL elevators has been somewhat slower in the U.S, but it is believed that the market and the international lifts manufacturers are leading towards to such a solution.

### **Canada**

#### **Eco Products**

The government of Alberta launched the Climate Leadership Plan in 2015, to reduce carbon emissions and increase power generation through renewable sources. Through the program, the government will phase out all pollution emittance from traditional energy sources by 2030. The scheme's main aim is to tackle climate change. This initiative is affecting the future of hydraulics in a negative way and the industry tilt towards to traction lifts with standby mode (low duty cycle) or regenerator (high duty cycle).

## **5.PEST**

(Political, Economic, Sociocultural, Technological)

### **The U.S**

The U.S of America is the third most populous country in the world, and the fourth largest by total area. With a population of over 318 million, the country is ethnically diverse and has the largest economy in the world. The country's growth slowed down after the 9/11 attacks and the recession in 2009 added to that as the economy contracted significantly. However, the economy is now moving on steady course forward thanks to increase in business investment, consumer expenditure and substantial decrease in unemployment.

### **Political**

USA has a strong democratic setup and effective rule of law, with elections that are considered fair and transparent. The country enjoys massive political and economic influence over both national and global policymaking, and is recognized as the leading superpower in the world. However, the country faces international criticism for its interventionist policies regarding the 'War on Terror' which is souring foreign relations, and at the same time fueling terrorist groups, increasing the threat of terrorism.

Since the January of 2017 Donald Trump assumed presidency, the new president unfold his political agenda. On his first day in office, the new president signed an executive order directing all federal agencies to minimize the "unwarranted economic and regulatory burdens" of the Affordable Care Act. Trump also ordered a freeze on all new regulations that agencies had been working on during the previous administration. On January 23, Trump signed an executive order withdrawing the U.S from the Trans-Pacific Partnership, an unratified free trade agreement. That same day, Trump signed another order re-instating the Mexico City Policy and a third order that placed a freeze on federal hiring.

During the first days of Trump's Presidency with the cabinet not been formed yet, it is uncertain the level of implementation of his political agenda. It is believed that the formation this agenda would have severe affect not only in domestic policies but also in bilateral relations which may bring new tensions in South East Asia and Middle East.

## Economical

With a GDP of over \$18.037 trillion, the US is the largest economy in the world. The economic system is well-developed and gathers its strength from its services and manufacturing industries. The recession in 2009 adversely affected the economy of the country and unemployment rates soared to an alarming point. But the economy bounced back with a growth of around 4% in the third quarter of 2014 as consumers and businesses have stepped up spending. However, the increasing budget deficit puts the economic prosperity of the country at grave risk as the deficit currently amounts to a staggering \$506 billion.

In 2016, growth declined due to poor performance in the first half of the year. In 2017, activity is expected to pick up, however the magnitude of the acceleration will also depend on the success or failure of Donald Trump, newly elected president, and the credibility of his economic plan. The latter has stated, during his campaign, his intention to double the growth rate, raising it from to 3.5-4%. However, the President's plan to increase government spending, through a massive investment plan to renovate the country's crumbling infrastructure, coupled with lower revenues, corporate tax cuts and a reduction in the maximum income tax bracket, may not deliver the promises of growth revitalization made by the candidate.

*Table 7: Major Macro Economic Indicators the U.S*

	2014	2015	2016 (e)	2017 (f)
GDP growth (%)	2.4	2.6	1.6	1.8
Inflation (yearly average) (%)	1.6	0.1	0.2	2.1
Budget balance (% GDP)	-4.2	-3.5	-4.1	-4.3
Current account balance (% GDP)	-2.2	-2.6	-2.4	-2.7
Public debt (% GDP)	104.7	105.2	108.2	108.4

*Source: Coface*

The new economic agenda is targeting the reduction of unemployment rate through the repatriation of the U.S. manufacturing companies from overseas giving taxation benefits. It is saying that the government will increase customs on imported products in order to force enterprises to produce products in the continental the U.S.

Mr Trump's desire for increased protectionism, as evidenced by the abandonment of the Trans-Pacific Partnership (TPP). His rhetoric is based, in particular, on the view that the U.S is the main loser of world trade, its persistent trade deficit being a gaping wound for the country. Nevertheless, Mr Trump's protectionism is hampered by the need to resort to the trade deficit. Indeed, the weakness of the national savings in the U.S (about 3% of the national income) compels the country to import a surplus of foreign savings. The inflows of its capital deepen the deficits of the trade and current account balance. Funding the budget deficit as envisaged by the President's plan would however require more foreign savings, not less, and would increase the trade and the current account deficit in 2017.

Moreover, the upward pressure on the dollar, exacerbated by the attempts of monetary tightening by the Federal Reserve, would also have an impact on the current account deficit. Its high level increases the cost of American products, especially manufactured goods, in a context of low rebounding of partner economies. This context will weigh on export growth and will favour the value of imports carried, furthermore, by the momentum of consumption.

### **Sociocultural**

Like most developed countries, the US faces the problem of an aging population which can lead to a serious labor shortage and rising tax rates in the future. Nonetheless, the education and healthcare system is one of the best in the world. A majority of the population has a liberal mindset, but rising racial intolerance is a serious concern. Additionally, increasing illegal immigration is another concern, as there are currently more than 11.7 million people living illegally in the US, further increasing the risk of racial discrimination.

### **Technological**

Innovation and technology are the cornerstones of the US economy. Since its inception, the country has been leading in terms of adapting and applying technology. Though the country faces strong competition from rising economies, it is expected it will continue to retain a technology supremacy over its competitors. Additionally, the US has also been at the forefront in enhancing and developing technologies in areas such as nanotechnology, environmental technology and biotechnology, which opens up massive opportunities for companies with expertise in the mentioned fields. IT is another field the US has been excelling in. However, it has also been facing intense competition from countries like China and India.

## Canada

One of the wealthiest nations of the world, Canada is a member of the Organization of the Economic Cooperation and Development (OECD) and the G-8. Canada's economy is dominated by the service sector. One of the few nations in the world to be a net exporter of energy, Canada finds its place amongst the top ten trading nations in the world.

In 2016, activity suffered with the worsening state of the oil and gas sector, further exacerbated by the huge fires in the province of Alberta in May 2016. Growth is however expected to quicken in 2017, driven by domestic demand and non-oil and gas exports.

### Political

Justin Trudeau was elected Prime Minister of Canada in the most recent parliamentary elections in October 2015, taking over from the conservative Stephen Harper, who held the post for almost ten years. Trudeau's Liberal Party (centre-left) won 184 of the 338 seats in parliament, giving it an absolute majority. Diplomatic and trade relations have also been strengthened with a large number of countries (Mexico, Ukraine, etc.) since he came to power. In addition, the trade agreement between Canada and the EU (CETA), signed at the end of 2016, could have positive consequences for the country's exports as of 2017. The Prime Minister also wants to reduce the obstacles to trade between the country's ten provinces where non-tariff barriers still exist relating to the movement of goods, capital and people.

Finally, the business climate is eased by the simplicity of starting a business and of obtaining credit and the low level of taxes.

### Economical

Table 8: Major Macro Economic Indicators Canada

	2014	2015	2016 (e)	2017 (f)
GDP growth (%)	2.5	1.1	1.2	2.1
Inflation (yearly average) (%)	1.9	1.1	1.7	2.1
Budget balance (% GDP)	-0.5	-1.4	-2.5	-2.3
Current account balance (% GDP)	-2.3	-3.2	-3.7	-3.1
Public debt (% GDP)	86.2	91.5	92.1	90.5

Source: Coface

The weakness in oil prices caused a refocusing on other sectors, taking advantage of the depreciation in the Canadian dollar and increased demand in its export markets (namely the U.S). Investments into these sectors will therefore be especially strong boosted by very low interest rates, thus helping to ensure a recovery in activity. Unemployment rates vary from province to province. At the national level, unemployment is set to continue declining (7% in 2016), although this fall does not reflect regional disparities. In those provinces where the oil and gas industry predominates, unemployment rates will increase, reflecting the gradual decline of the sector. Growth in other sectors will however help to create jobs for workers leaving the oil and gas industry.

The government plans to spend 60 billion dollars over ten years on infrastructure projects aimed at boosting the economy.

The first phase of this plan is scheduled for completion in 2019 and includes an investment of 10 billion dollars in public transport, alongside green infrastructure projects, in particular in Alberta, British Columbia and Quebec. The budget also includes redistributive measures targeted at the most economically disadvantaged and the middle classes. Taxes on low and mid-range incomes are due to be reduced, at the same time as those on high incomes will increase. The public debt at the federal level, although high, will stabilise. In terms of the provinces, Quebec and Ontario, the two most heavily indebted provinces, accounting for 60% of GDP, two-thirds of the population and over half of all exports, will need to continue their cautious management of their budgets.

The current account deficit is expected to fall slightly in 2017. The current account balance will depend on raw material prices as well as the economic situation in the U.S which is, far and away, Canada's leading trading partner (75% of all exports). This lack of diversity in export markets is a potential threat to the current account balance, especially as the NAFTA could be subject to renegotiation following the election of Donald Trump. Exports in the non-oil and gas sectors should however offset the rise in imports (resulting from growing domestic demand), thus helping to produce an improvement in the balance of trade.

The government also introduced the 'Made in Canada' initiative under the Economic Action Plan 2014, with the aim to promote large scale manufacturing activity in the country. The program seeks to encourage domestic and foreign manufacturers to improve their

manufacturing bases within Canada, without off shoring their manufacturing activities to other countries. The government's initiative is expected to attract investments from local manufacturers over the forecast period for establishing their own manufacturing plants in the country. In addition, the ongoing efforts of domestic manufacturers to upgrade their manufacturing facilities in the country are also expected to drive investments in the industrial construction market.

The main downwards dangers arise from any unfavourable renegotiation of the NAFTA, alongside any correction in property prices, which will impact on residential investment and household consumption.

### **Sociocultural**

Labour force participation is promoted through employment programmes and policies. The support system is provided by government to unemployed, underemployed, and labour market in transition. Universal Child Care Benefit System is another initiative taken by government to support parents on monthly terms to have C\$1000 for each child under the age of six (Datamonitor, 2011). A programme for OLES introduced by government of Canada to enhance the knowledge of employees regarding work, promoting training, tools, and skills required to perform tasks. CPP is a Canadian Pension Plan that has been introduced by government to ensure that aging population's needs are catered. The retiring people at the age of 65 benefit from CPP.

Household consumption will also be more lively, boosted by falling unemployment and lower property prices, and despite already high levels of household debt (170% of gross disposable income) and low savings rates (4.2% of gross disposable income). There could be some tightening of the monetary policy of the Central Bank (higher policy interest rates) in order to reduce inflationary pressures arising from growing domestic demand. Inflation will therefore steady at around its target rate (2%).

### **Technological**

The high-end developed products are produced through well-established manufacturing industry. The integration of North American market, R&D incentives, low tax rates, and qualified workforce are facilitating manufacturing sector (2014 Global Survey Report, 2014). Furthermore, aerospace industry benefits from machinery and tools produced through manufacturing sector. Interestingly, the US import 70% of goods that are manufactured in

Canada (Datamonitor, 2011). Since these goods hold true value-added element thus revenue returns for Canada is higher. The production cost is significantly low in comparison to advanced economies. The Information and Communication Technology (ICT) manufacturing is likely to benefit through manufacturing industry of Canada.

Canada is behind other advanced economies as the spending in R&D is substantially low. It is reflected that in GDP, only 2% is spend on R&D (Appendix). Furthermore, private sector has not been very active in investing in innovation which is reason for decline in R&D. In last one decade, Gross Expenditure on R&D (GERD) has fractionally declined reflecting that business enterprises are not willing to spend in innovation. Moreover, the innovation in commercial sector will be negatively affected by low investment in corporate spending. Though the ranking of Canada has improved as now it is 10th among 17 peer countries list of business expenditure on R&D.

## 6. Competition Landscape

### The U.S & Canada

#### Market Share Concentration

The industry has a low level of market share concentration, with the four largest players accounting for less than 25.0% of annual industry revenue. The industry contains many small-scale contractors who operate in either geographic or specialized markets. The fragmented structure of this industry is evident in the annual survey of County Business Patterns published by the US Census Bureau. Two-thirds of operators in the Elevator Installation and Service industry employ fewer than ten persons. In fact, about half of all industry participants employ fewer than five persons (50.8%).

*Table 9: Enterprises by employment size (2016)*

No. of employees	Share (%)
0 to 4	50,8%
10 to 19	13,8%
20 to 99	13,1%
100 or more	3,4 %

*Source: Us Census Bureau and IBISWORLD*

Geographically, there is a higher concentration of contractors in regions with a higher density of urban settlement (residential apartments). In addition, regions that have a greater concentration of manufacturing activity (e.g. the Great Lakes and Mid-Atlantic regions) also have a high concentration of industry participants. A handful of larger companies have invested in acquisitions campaigns, taking over several regional contractors operating across many markets. For example, Swiss-based Schindler Elevator Corporation has acquired smaller companies in Texas, Arizona, New York, New Jersey, Connecticut, Florida, Massachusetts, New Hampshire, Rhode Island and Vermont over the past five years. While this will expand the market share for individual industry players, the overall industry is still expected to be fragmented.

States with the highest employment level in this occupation:

*Table 10: Employment of elevator installers and repairers, by state, May 2016*

State	Employment <sup>5</sup>	Employment per thousand jobs	Location quotient <sup>6</sup>	Hourly mean wage	Annual mean wage <sup>7</sup>
New York	3,800	0.42	2.78	\$40.33	\$83,880
Texas	2,580	0.22	1.46	\$34.14	\$71,000
Florida	1,790	0.23	1.48	\$29.35	\$61,050
Illinois	1,760	0.30	1.98	\$40.24	\$83,700
California	1,710	0.11	0.73	\$44.19	\$91,920

*Source: Bureau of Labor Statistics*

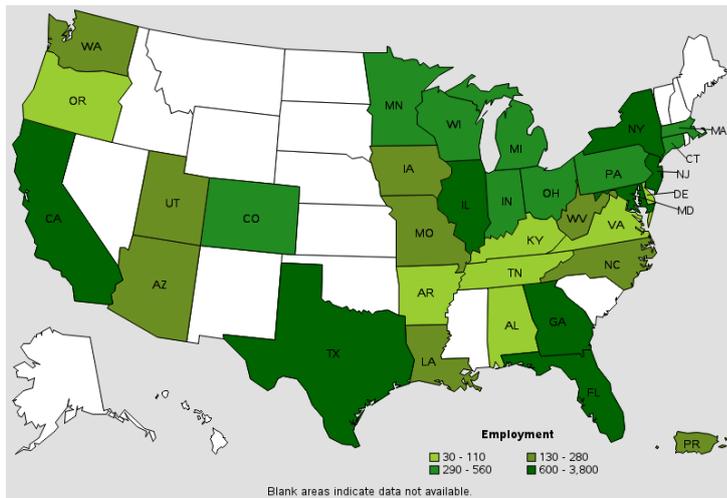
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<sup>5</sup> Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.

<sup>6</sup> The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

<sup>7</sup> Annual wages have been calculated by multiplying the hourly mean wage by a "year-round, full-time" hours figure of 2,080 hours; for those occupations where there is not an hourly wage published, the annual wage has been directly calculated from the reported survey data.

Figure 19: Employment of elevator installers and repairers by state



Source: Bureau of Labor Statistics

### Barriers to Entry

There are few entry barriers for qualified prospective participants seeking to enter the Elevator Installation and Service industry. With 69.7% of all companies operating with less than ten employees according to the US Census Bureau, this industry is characterized by a low market concentration. However, the barriers to entry are considered to be medium due to short term factors favouring incumbent contractors. Specifically, new entrants without a proven track record will find it difficult to establish a viable foothold in this market over the short term as they lack a proven track record.

The key factors favouring ease of entry into the industry include: the low capital costs of establishing a start-up; and the high attrition rate among existing contractors. Start-up costs require the purchase of rudimentary tools such as basic lifting equipment (e.g. hoists) as well as basic hand and power tools. Sophisticated laser, ultrasonic measuring tools, and heavy positioning equipment, may be necessary to compete in some industry segments (e.g. placement of precision equipment), but most operators can compete without substantial capital outlay.

This industry is also characterized by the high attrition rate of skilled contractors due to the arduous nature of the work and lack of upward promotion. This attrition rate tends to withdraw highly experienced labour from the industry. Consequently, this provides opportunities for new entrants to gain a market foothold.

However, with no proven reputation for quality workmanship and timeliness in service delivery new entrants struggle to capture a significant presence in the market. Given the requirement for accuracy of installation, the proven capacity to follow blueprints as well as the high priority given to completing projects within tight timeframes, it is likely that new entrants will be disadvantaged when contesting against existing contractors. Contractors operating in this industry also are required to hold suitable qualifications to be eligible for state registration and licensing. Together these factors form a formidable barrier to entry for prospective participants.

Access to the maintenance and repair market for new entrants has been further diminished in recent years by the trend toward the larger scale contractors entering into long-term facilities management arrangements with major customers. These facilities management contracts typically span a range of aligned service trades (e.g. electrical, plumbing and air-conditioning). In addition, product manufacturers such as ThyssenKrupp Elevator and OTIS Elevators, also provide product installation and maintenance services limiting demand for independent contractors. In fact, through its competitor equipment support group, that carries more than 10,000 competitor parts, OTIS provides maintenance and repair support for non-OTIS elevators. As a consequence, new entrants are likely to be significantly disadvantaged by the existing relationships between contractors, machinery suppliers, and leading customers (e.g. property developers, builders and plant owners).

### **Industry Globalization**

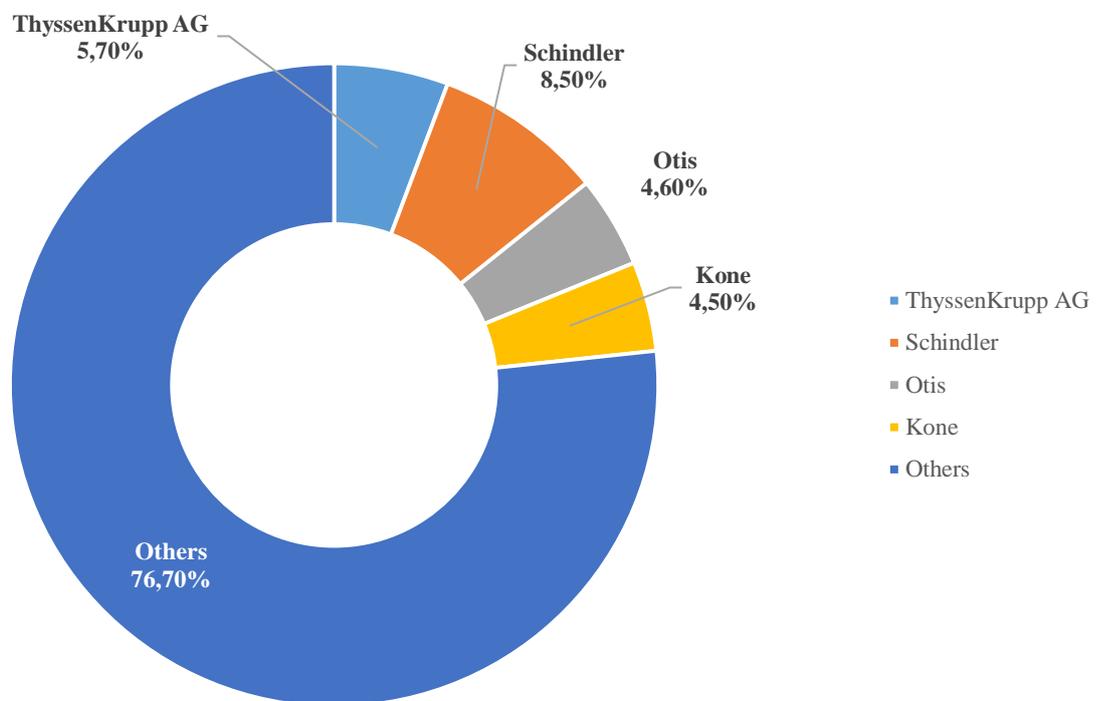
The level of industry globalization is low as international trade in these services is negligible. Furthermore, most of industry activity is undertaken by locally owned contractors.

Many of the large scale global manufacturers of elevators, building automation systems and precision industrial machinery maintain substantial in-house installation and maintenance operations in the U.S and repatriate profit to European and Asian parent companies. However, the in-house activities of these global manufacturers are estimated to account for much less than 25.0% of industry revenue. The level of foreign ownership in the US elevator installation and servicing market, however, has been steadily increasing over the past five years.

## Major Companies

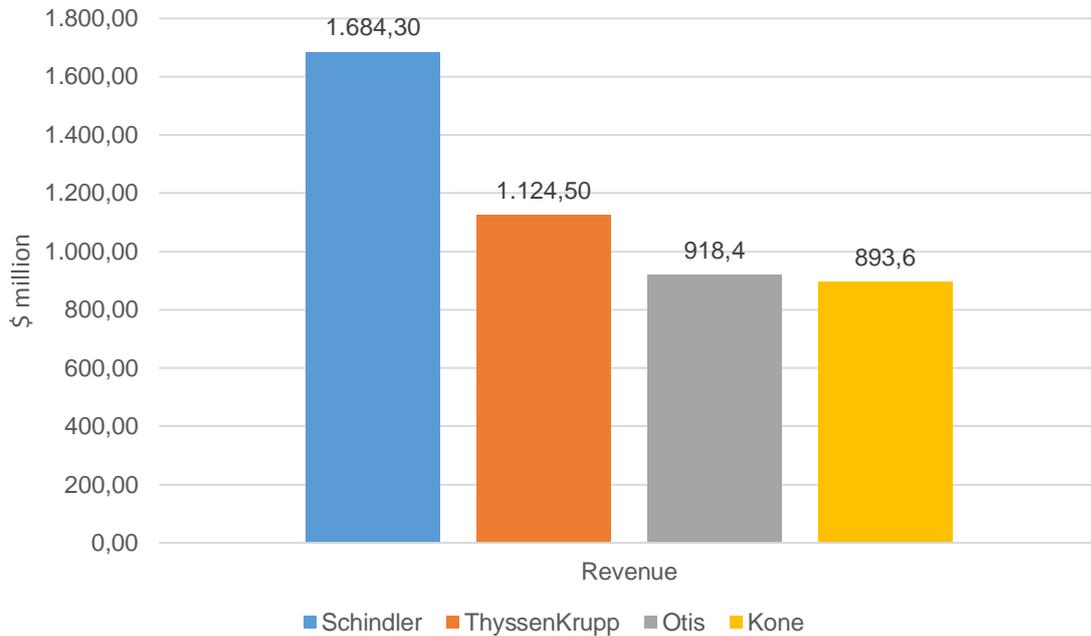
The Elevator Installation and Service industry is highly fragmented and characterized by a large number of small contractors serving narrow geographic markets. However, elevator and industrial machinery manufacturers have captured an increasingly dominant position in this industry through the acquisition of service companies and by providing in-house installation, repair and maintenance services.

Figure 20: Market Share



Source: *Elevator Installation & Service in the US*

Figure 21: The U.S. Industry Revenue



Source: *Elevator Installation & Service in the US*

### **Schindler**

The company is the largest escalator company and second-largest elevator company in the world. Its North American operation, Schindler Elevator Corporation, is responsible for designing, manufacturing, installing and servicing elevators, escalators and moving walkways. In recent years, the company has rapidly expanded its servicing operations with multiple acquisitions in the U.S and Canada, and now employs more than 6,500 workers in over 250 locations.

In its 2014 annual report, the Schindler Group noted that the elevator business in North America achieved increased orders for new installations and modernization, as US construction markets picked up significantly since 2011. To strengthen its market share, Schindler Elevator Corporation in 2011 acquired Midland Elevator Company Inc., a leading North American elevator and escalator company.

### **ThyssenKrupp**

ThyssenKrupp AG was founded in 1860 and is headquartered in Essen, Germany. In 2013, company declared its intention to shift the company away from the volatile steel sector to higher-margin businesses such as elevators and factory equipment. Following this strategy,

ThyssenKrupp acquired AMCO Elevator Inc. and Edmonds Elevator Inc., two leading providers of maintenance, repair, new installation and modernization of elevators in the U.S.

Elevator Americas unit includes the US, Canadian and South American markets, with the U.S. accounting for 20.0% of total group revenue. Strong sales of new installations and efficiency gains have maintained industry-specific growth. While the US segment experienced a sharp decline for new elevator installations following the economic downturn, the rebound in construction markets starting in 2011 has revitalized the group. In fact, the company's US subsidiary, Braun ThyssenKrupp, has installed more than 50 elevators and 11 escalators at One World Trade Center.

### **Otis Elevator Company**

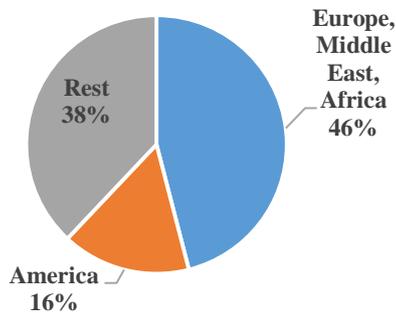
United Technologies Corporation (UTC), founded in 1929, is a diversified global company operating in the building and aerospace industries. Through its subsidiary, Otis Elevator Company, UTC is one of the largest elevator manufacturers in the world, having installed more than 2.4 million elevators and escalators and servicing more than 1.7 million elevators, escalators and moving walkways worldwide. The company currently employs about 7,000 US workers. Otis's well-known US installations include Seven World Trade Center, New York (elevators); the Waldorf Astoria Hotel, New York (elevators); the Chrysler Building, New York (elevators); Luxor Hotel, Las Vegas (inclined elevators in a pyramid-shaped hotel); and the John Hancock Center, Chicago (elevators).

Growth in industry-specific sales was driven by strong installation orders assisted by a rebound in construction markets, especially since 2011. Furthermore, Otis has invested heavily in growing its maintenance and repair division. The company's Competitor Equipment Support Group has over 10,000 competitor parts available, presenting clients with an attractive servicing option.

### **Kone Corporation**

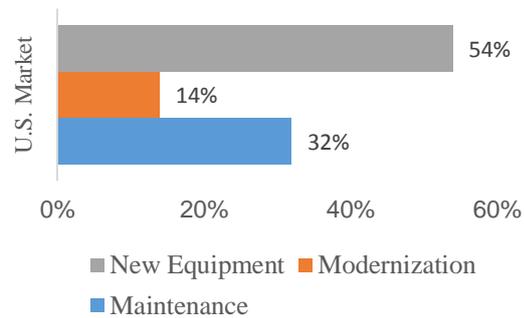
The Kone Corporation was founded in 1910 and is headquartered in Espoo, Finland. The company manufactures, installs and services elevators, escalators and automatic doors. Kone operates 800 service centers in more than 50 countries, servicing 650,000 elevators and escalators and nearly 270,000 automatic doors.

Figure 22: Global Kone Sales revenue



Source: IBIS World

Figure 23: Kone the U.S. Market



Source: IBIS World

With favourable economic conditions and an improved construction market, IBISWorld anticipates that Kone Inc. will generate about \$893.6 million in industry-specific revenue for 2016.

## 7. Case Study: KLEEMANN

### 7.1 KLEEMANN Corporate Profile

KLEEMANN is a global elevator company, distributing all over the world and serving the construction sector from major industry to commercial buildings and private properties. Its head office remains in Kilkis, Greece, where it first started production over 30 years ago, with additional company-owned manufacturing facilities in Greece, China and Serbia and two assembly lines in Russia and Turkey. This core structure is complemented by its local presence in the UK, Germany, China, Russia, Turkey, Greece, Serbia, Romania, Croatia, the UAE, Australia, Poland and France. Through this network, KLEEMANN exports to more than 100 countries worldwide.

Installation and maintenance companies handle the distribution of our products all over the world. Well-regulated close contact between our management teams, employees and collaborative parties allows us to build and maintain strong, long-term relationships with its customers and provide reliable service across the globe. KLEEMANN's strategic approach

and investments have enabled the specialised manufacture and export of products into a range of markets, developing our client list, international presence and product range.

KLEEMANN dedicated Research and Development Department analyses latest market trends and technological developments to continually update and expand our product range. This, along with pioneering initiatives such as its partnership with world-renowned designer Andreas Zapatinas, ensure further expansion and an increased share in the global market in years to come. KLEEMANN stands for innovation in design and technology, for flexibility and pragmatic thinking, for quality products and dedicated service and support. Its manufacturing facilities, highly trained workforce and state-of-the-art IT systems and logistics support enable them to deliver reliable, highly personalized solutions, whatever the challenge.

## **7.2 KLEEMANN in North America**

KLEEMANN, as has already been mentioned above, exports in 100 countries worldwide and now starts to study its expansion in North America in the late 2000s. First, a research should be made to understand and evaluate the differences between the U.S. Elevator Standard with the European one which KLEEMANN's products are compliant.

R&D amend certain company's products to be compliant with US regulations. In an elevator package, specific components must have a CSA/UL certificate. Even though a certificate acquisition is easy, the harsh difficulty was to minimize market oriented product changes.

The basic characteristic of North America products is the lack of building limitations (ex. Shaft dimensions) in comparison with European ones.

KLEEMANN's North America elevator package, it should not include controller and doors but mainly mechanical parts. The reason for such a solution is that time needed for the certifications would be considerably long and a local manufacturer (electronics & doors) would support sufficiently.

In 2017, KLEEMANN should start business discussions with local elevator suppliers, to transfer know how in hydraulic elevators. KLEEMANN's long years' experience in hydraulic

elevators should be transferred after the formulation of an agreement and give the opportunity to gain profit margin in US and Canada. The transportation time of materials from KLEEMANN to local supplier premises would be a significantly pushback.

Table 11: KLEEMANN SWOT Analysis in US

	HELPFUL To achieving the objectives	HARMFUL To achieving the objectives
Internal Factors	<ul style="list-style-type: none"> <li>• Prices</li> <li>• Customization</li> <li>• Agreement with DL Martin</li> </ul>	Weaknesses: <ul style="list-style-type: none"> <li>• Delivery Time (to USA)</li> <li>• Complete Lift Package (for US)</li> </ul>
External Factors	Opportunities: <ul style="list-style-type: none"> <li>• Hydraulic Market</li> <li>• Spare Parts</li> <li>• Entrance in US market will benefit projects in third countries requiring US standards</li> </ul>	Threats: <ul style="list-style-type: none"> <li>• Regulations</li> </ul>

## 8. Corporate Strategy & Strategy Implications-Suggestions

Market penetration involves focusing on selling existing products or services into existing markets to gain a higher market share. A market penetration strategy involves focusing on selling existing products or services into existing markets to gain a higher market share. This is the first strategy most organizations will consider because it carries the lowest amount of risk.

Figure 24: Market Penetration Strategy



### **More Distribution Channels**

#### **Local Supplier agreement**

KLEEMANN through the signed agreement with a local elevator supplier will succeed to enter the U.S. market with minimum risk. The know-how could improve the supplier's revenues which comes in favor of KLEEMANN profits. The instability in US politics and the alleged financial constraints will confirm the rightness of the choice.

#### **Greek Community**

Strong Greek American community could count as an asset in the establishment of KLEEMANN in North America elevator industry. Greek Americans have the highest concentrations in the News York, Boston, and Chicago regions, but have settled in major metropolitan areas across the U.S. According to the 2011 Canada census Greek Canadians have the highest concentrations in the Ontario, Quebec, British Columbia, and Alberta regions. Only in Chicago area, there are over 30 construction companies with Greek descent owners.

## **Emphasize on existing solutions**

### **Hydraulic Elevators**

By emphasizing on hydraulic elevators, KLEEMANN has the competitive advantage against its competitors because of years of experience in development on such solutions. Moreover, hydraulic elevators are the majority of new installations.

### **Lift Compartments**

KLEEMANN could focus on the production of competitors' elevator parts, especially on hydraulic parts. These would extend company's base. Doubtless this solution requires an investment which should be followed by a techno-economic research.

## **Emphasize in Marketing Strategy**

KLEEMANN targets resellers and not directly the end-users. All of its actions and marketing strategies below are based on this fact.

### **Relationship Marketing**

It is true that customers who enjoy a steady and ongoing personal relationship with the company's representatives are likely to spend more money with this brand than looking for another company to work with. KLEEMANN has been investing in building strong relationships with all of its customer around the world during the last 35 years.

KLEEMANN should invest on people and on strengthening its relations with the customers through constant communication with them and other benefits (by loyalty program) to increase their engagement with KLEEMANN and eventually their turnover.

### **Tradeshaw Marketing**

Many products have to be experienced to be bought. Although in the case of KLEEMANN this is not possible, tradeshaws and exhibitions give the opportunity to convey the KLEEMANN experience to prospect customers. An exhibition is a chance to for KLEEMANN to meet many market stakeholders and increase the brand awareness in the U.S and Canada. This means that the company's participation has to be 100 % coherent with the KLEEMANN identity, brand personality, values and vision.

## 9. References

### Researches

Construction Intelligence Centre. "Industry Forecast, Construction In Canada– Key Trends And Opportunities To 2020". Construction Intelligence Centre (2016)

Construction Intelligence Centre. "Industry Forecast, Construction In USA– Key Trends And Opportunities To 2020". Construction Intelligence Centre (2016)

Credit Suisse. "Global Elevators & Escalators". Credit Suisse (2014)

Elevator World. "Vertical Transportation Industry Profile". Elevator World (2014)

Global Industry Analysts, Inc. "Elevators and Escalators, A Global Strategic Business Report" (2008)

IBIS World. "Elevator Installation & Service in the US". IBIS World (2015)

### Websites

"BLS: Bureau of Labor Statistics, The U.S Department of Labor.". *Bls.gov*

"COFACE: Credit Insurance, Debt Collection, Factoring, Business Information, Bonds, Economic Studies.". *Coface.com*.

"PCA: America's Cement Manufacturers.". *Cement.org*

"THE WORLD BANK: The World Bank Group.". *Worldbank.org*

"THE WORLD FACTBOOK: Central Intelligent Agency.". *Cia.gov/library/publications/the-world-factbook/*