

State of Industrialization

Results of 2020 Research Conducted by MCA, Inc. for ELECTRI International

What is Industrialization?

Industrialization occurs when work is transferred from humans' tacit knowledge to digitized explicit knowledge. The results include significant productivity improvement, market expansion, and labor force expansion. This process has occurred in many other skilled trade-driven industries and construction is in the midst of the process now.

1. Management of Labor
2. Management of Work
3. Lean Operations
4. Modeling and Simulation
5. Feedback from the Source

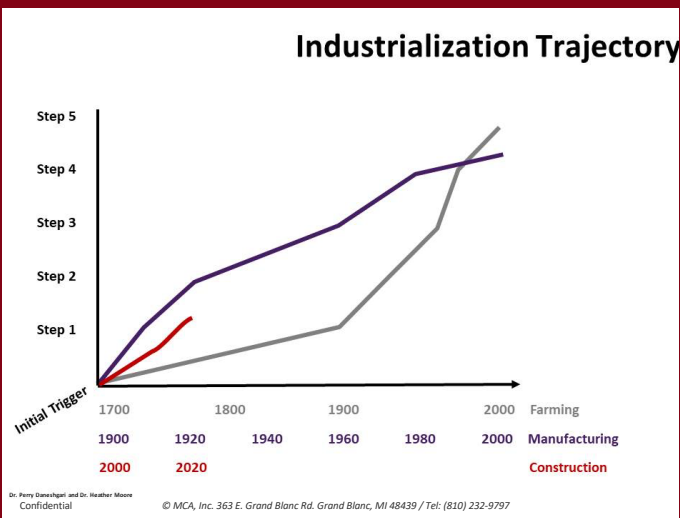


Figure 1

INDUSTRIALIZATION TRAJECTORY

ELECTRI International provides research and education for the electrical construction industry. The organization commissioned MCA, Inc. to study and identify how Industrialization of Construction® will continue to unfold and to provide ELECTRI and the EC industry a means of getting and staying ahead. Historical trajectories of Industrialization metrics in other industries, including farming and manufacturing, as well as the current path the construction industry is taking, have provided insights on what is to come (see Figure 1).

EVAULATE YOUR COMPANY

The evaluation questions look at each step of Industrialization to calculate where an organization falls in terms of level of Industrialization. To take the evaluation and determine your company's position in the trajectory of Industrialization, click [here](#).

INDUSTRIALIZATION INDEX SELF-EVALUATION

Step of Industrialization	Question	Rate 1-4
Management of Labor (Who Does What)	Does your company use electricians to do installation?	
	Does your company measure what the field labor is doing?	
	Does your company use the field measurements for improving labor's work environment (productivity and safety)?	
Management of Work (When & Where)	Does your company involve the field to plan the work and identify prefab?	
	Is a Work Breakdown Structure used to plan who does what, when, and where for each activity?	
	Is more than 50% of the work done offsite?	
Lean Operations (One Best Way)	Does your company believe that every job is "unique" in construction?	
	Do the final parts/assemblies come to the jobsite without needing manipulation/changes before installation?	
	Does your company measure jobsite variation and categorize its root causes?	
Modeling & Simulation (Prediction & Projection)	Does your company use the BIM model and/or digital layout to organize the install on more than one-third of its jobs?	
	Does your company use data from job models to perform FMEA for risk reduction and work optimization?	
	Do all of your company's jobs have a complete model of work, effort, time, and information?	
Feedback from the Source (Human Input into Continuous Improvement)	Does your company collect any data that are not reviewed and/or used by the people collecting it?	
	Does your company have more than 3 days of material, tools, and manpower scheduled on its jobs?	
	Do all of your company's jobs have a complete model of work, effort, time, and information?	



SIGNAL VS. NOISE

No doubt, there are changes happening in the industry. But how do we know whether our observations are simply noise or if they are true signals of Industrialization? How can individual contractors know if changes are happening in their individual market?

Characteristics that we observe (signals + noise):

- Market is changing
- Less specialization is required
- Unionization is declining
- Types of markets are changing
- System Productivity is the main difference

Measurable signals isolated from noise:

- Labor cost per dollar sold (see Figure 2)²
- Industry’s cost share vs. GDP share
- Expansion of market (cars per household) (see Figure 3)

Signals for individual electrical contractors to watch for:

- Changes in employment / the type of jobs needed to be filled
- Change in the product demanded, decoupling the outcome from inputs
- Inability to compete with historic / current labor cost structure
- Inability to “keep up with” project schedules and timelines
- Increased M&A activity and new types of businesses

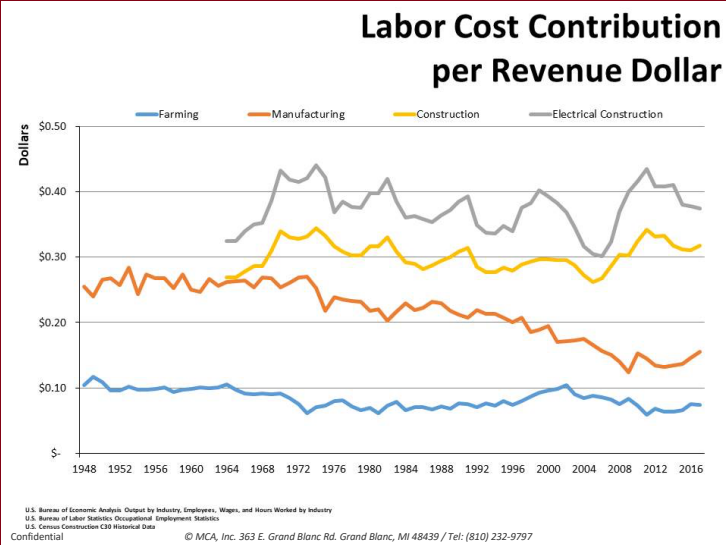


Figure 2

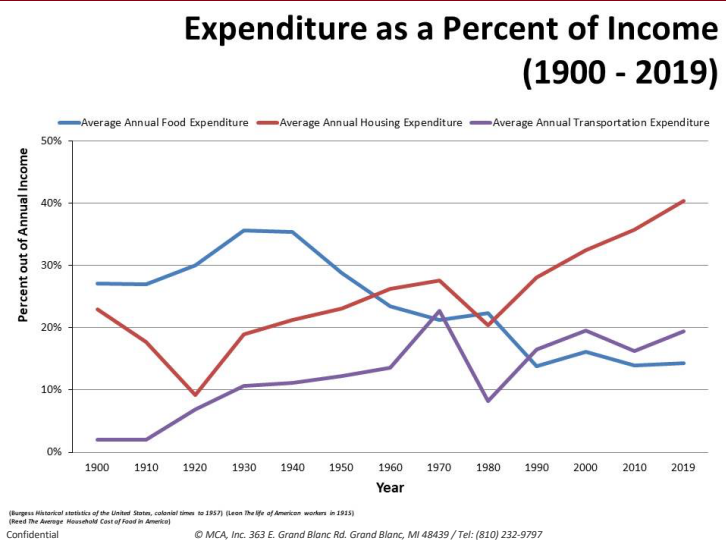


Figure 3

THREAT OR PROMISE

How will it expand?

- Where the customer is least served
- High labor cost per \$ sold (see Figure 4)²
- Large composite rate differences
- Significant market expansion
- Work with minimum specialization required
- High levels of skilled trade shortage
- International borders

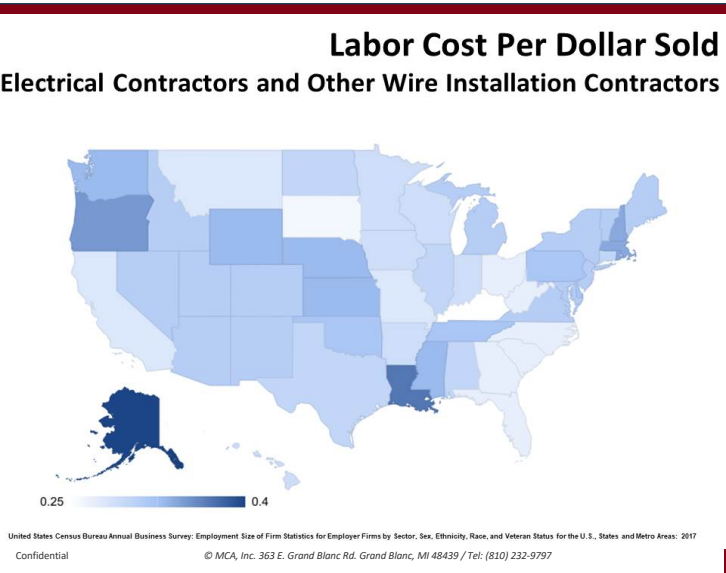


Figure 4

¹ The Industrialization trajectory was created based on historical data and research from manufacturing, agriculture, and construction industries. The main sources are listed below:
Daneshgari, Perry, and Heather Moore. *Competing in the New Construction Environment, A Compilation to Lead the Way. Books 1-4.* ELECTRI International, 2017.
Ford, Henry, and Köthe Sigurd. *My Life and Work.* Velhagen & Klasing, 1951.
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Taylor, Frederick Winslow, and Harlow S. Person. *Scientific Management.* Harper, 1947.

² Labor cost per dollar sold data are derived from market studies previously conducted by MCA, Inc. as well as data derived from:
Annual Business Survey: Employment Size of Firm Statistics for Employer Firms by Sector, Sex, Ethnicity, Race, and Veteran Status for the U.S., States and Metro Areas: 2017

³ Expenditure as a percent of income data was derived from:
Burgess, Robert W. *Historical Statistics of the United States, Colonial Times to 1957.* U.S. Dept. of Commerce, Bureau of the Census, 1960.
Carol Boyd Leon, "The life of American workers in 1915," *Monthly Labor Review*, U.S. Bureau of Labor Statistics, February 2016, <https://doi.org/10.21916/mlr.2016.5>.
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For further detail on sources and references used in the study, please see the references on pages 3 and 4.



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