



IT Maturity Method Technology Advancement: Autonomous Vehicles

The IT Maturity Method (ITMM) uses IT to methodically enhance, advance, integrate, and mature businesses.

The ITMM quickly evolves IT and the broader enterprise into focusing on how technology can be used to impact and improve business function and further on how IT can be used for the transformation/maturation of organizations.

IT Enterprise Architecture is the art and science of creating a holistic model of the technology and business processes of an enterprise. IT Maturity advances this art and science several steps further as follows:

1. The art and science of creating holistic models is extended to Vendor Integration, as well as Leadership Improvement.
2. Mechanisms for tracking and measuring of technology, business processes, vendor integration, and leadership are provided.
3. Tuning and advancing tools are built based on the results of tracking and measuring.
4. Methodologies are provided to evolve product and services based on emerging technology.

In this article we discuss the coming tsunami of autonomous vehicles. ITMM Technology Advancement can be used to take advantage of this change.

[Autonomous cars are on the roads now and will hit the market around 2018! How will this affect your business \(Part 1\)?](#)

Google has announced that they have accumulated [140,000 miles for their autonomous vehicles](#) on public roads. General Motors has been claiming since 2008 that they will have [autonomous vehicles on the market around 2018](#). Are we really that close?

Yes! Back in the mid 1980's if a researcher wrote in a research paper that his autonomous vehicle went more than a hundred feet, he had to produce a video to prove it. By 2004 not much more progress had been made. The best vehicles were doing only thousands of feet. [DARPA challenged the community](#) and in a March 2004 desert competition one vehicle

miraculously attained a distance of 7 miles. The following year five different vehicles completed the full hundred mile plus course, including a team from Louisiana which had just been hit by a category five hurricane.

The next challenge in 2007 added the complexity of traffic in an urban environment. This time, six teams finished the 55 mile course successfully. Progress is swift, will your business keep up with the changes.

What will be the impact? How long will it take before all vehicles are autonomous? Will all professional drivers be put out of business? Will this have a greater impact than the replacement of horses with cars? What will happen to automobile insurance? What about the 400,000 hospital beds a year emptied as car crashes disappear? What about the disappearance of 2 million arrests a year for drunk driving? Will there be such a thing as a traffic ticket anymore?

What happens when this evolving technology is put into kitchen appliances, gardening equipment, and other products? How will your business environment be affected? Don't be left behind.

IT Maturity, Inc. provides training on how to integrate IT advances into the processes, products, and services of your business.

How can you know if your business will be affected in the mid-term by these advances? If your industry will be affected, you need to start making your plans now in order to stay ahead of the curve. The primary variables to be aware of include whether your products and services are highly used and repetitive. Driving, food preparation, food production, are highly used and repetitive. In the next five to ten years of automation, problems like these have a high likelihood of also being realized.

Years ago science fiction writers pictured vehicles being driven by androids. But this is not how vehicles are becoming autonomous. Instead sensors, actuators, processors, and telecommunications are being added to make vehicles autonomous. Thus, any highly used and repetitive activity that might be automated will similarly need to be able to use simple to moderately complex actuators, sensors, and communications, as well as emerging complex computation systems to parallel what is happening with autonomous vehicles.

While complex sensors and actuators might be necessary to manipulate the kitchen of today, it is easy to imagine a kitchen of tomorrow that does not require complex actuators (see bellow). As kitchens are the most commonly remodeled part of the home it is highly likely that the changes needed to realize automated kitchens in the near to mid-term will fall into place.

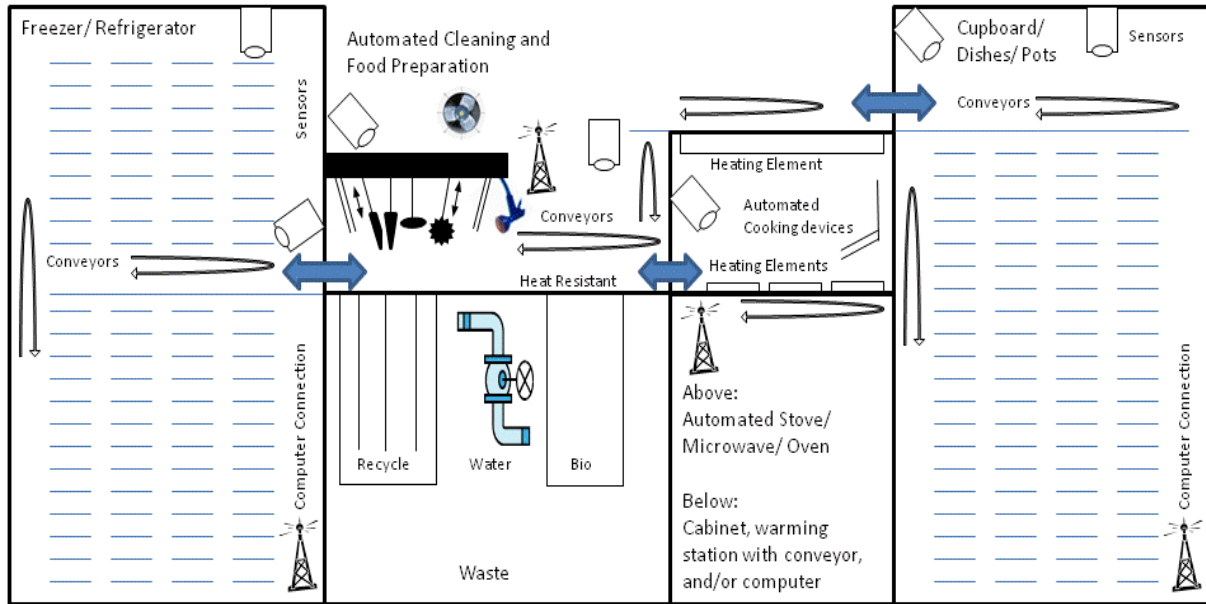
Autonomous cars have already driven hundreds of thousands of miles! How will this impact the kitchen?

How will the above impact other products such as those in the kitchen? Years ago science fiction writers pictured vehicles being driven by androids. But this is not how vehicles are becoming autonomous. Instead sensors, actuators, communications, and emerging complex computation systems are being added to make vehicles autonomous.

Robotic researchers are working on expensive androids for the home. However, the same strategy of adding sensors, actuators, communications, and emerging complex computation will bring affordable autonomous appliances to the kitchen much quicker. The question is which manufacturers will be first. Imagine a smart refrigerator that is connected to a smart phone and a smart convection oven/microwave. You will be able to instruct your smart kitchen to reheat a frozen dinner that will be ready when you arrive home. Add smart food preparation appliances and sinks and freshly prepared food will be created in the same way. All of this is well within reach within the same seven to eight year time frame discussed above for autonomous vehicles or even earlier.

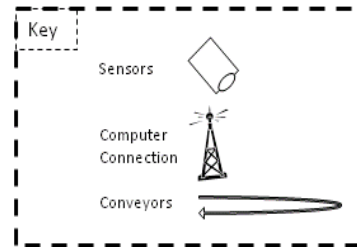
How will this impact the kitchen? The layout and construction of appliances, cabinets, and counters will be affected as will the plumbing, dishes, pots, and pans. Is your business ready? Or are you focused only on products similar to buggy whips, which disappeared when horses were replaced by cars?

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Prepared dishes are delivered at this station. Dirty dishes and leftovers can also be left at this station for processing.

All types of dishes can be prepared – drinks, frozen, cooked, heated, cold or combination thereof.



Usage Examples

Usage Example One: Groceries are delivered to the automated food preparation station, are separated if necessary and sent to the freezer/refrigerator or pantry/cupboard areas.

Usage Example Two: New Dishes, Pots, Pan, and utensil are cleaned, dried and delivered to the pantry/cupboard area.

Usage Example Three: Cold food such as fresh fruits and even fresh ice cream is prepared and sent back to the freezer/refrigerator for temporary storage. More temperature gradations will be available than today in both cooling and warming areas for different food needs. Food is moved back to the automated food preparation area for final delivery just before consumption.

Usage Example Four: Food is moved from both the pantry/cupboard and freezer/refrigerator to the automated food preparation station, unpacked, prepared for cooking, and then sent to the cooking station where it is cooked. Refuse from unpacking, slicing and dicing is put into appropriate refuse/recycle/sewage areas just below the automated food preparation area. After cooking, food is sent to the warming area just below cooking. Food is moved back to the automated food preparation area for delivery just before consumption. Final food presentation can be tuned at this time.

Usage Example Five: The automated food preparation area is used both for final food delivery as well and a retrieval area for dirty dishes and unfinished portions. Both water pressure and heated air are used in this area to clean dishes, which are then automatically returned to the cupboard/pantry area for storage.

Usage Example Six: Packaging is automatically removed and sorted into trash and recyclables. Separate recycling bins are available for paper, metal, and plastic containers. Preparation of produce produces bio-refuse which can be stored for reuse as fertilizer. Water pressure takes other bio-refuse into the sewage system.

Usage Example Seven: Dishes, Pots, Pan, utensil, and storage containers are delivered from and returned to the cupboard/pantry area for usage in the automated food preparation area.

Usage Example Eight: Mobile phones, web and computer based applications, microphones, and phones, can be used both in written and auditory form to communicate desired food, quantity and timing. Interfaces include menu options based upon food stores, dietary constraints, dietary preferences, nutrition needs, variety, weather conditions, holidays and other information.

Usage Example Nine: The system monitors food store levels, food spoilage/expiration, dish breakage and other issues. Providing notifications such as grocery lists when appropriate.

Usage Example Ten: The automated food preparation area can store left overs in containers retrieved from the cupboard/pantry and then send the load over to the freezer/refrigerator.

Usage Example Eleven: Owners of automated food preparation systems can provide low-level catering services. There are many web-based services that now offer rental of personal vehicles and homes on short term bases. Similar web-based services can be created for personal catering and pooling of catering. As software is used to maintain cleanliness and quality of food in these systems, safety and quality can be assured and authenticated.

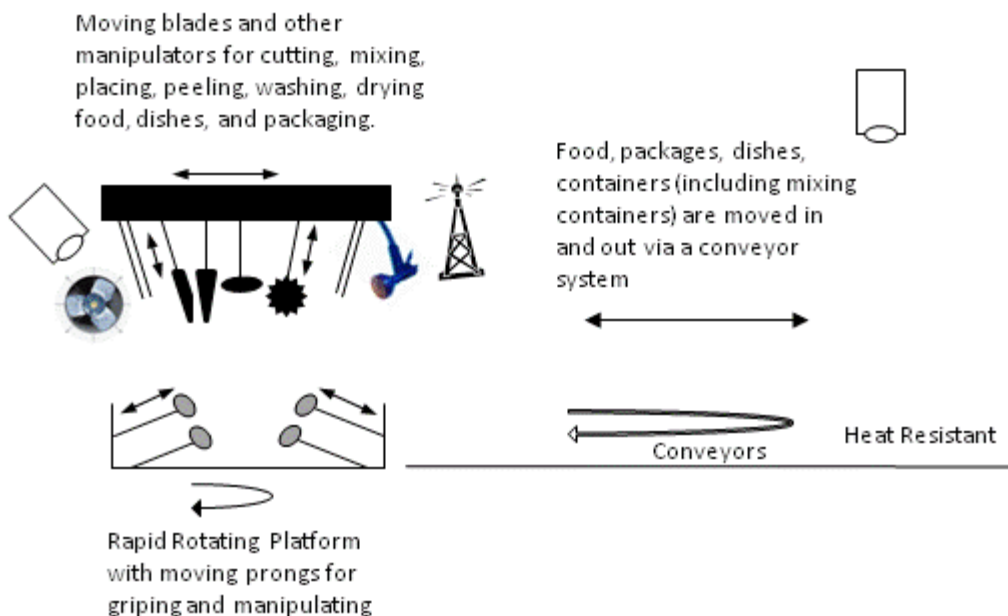
Usage Example Twelve: The kitchen preparation area will require less floor space for counters and cabinets as storage will be optimized around automated retrieval as opposed to immediate and regular human access. Social and eating areas will be expanded. More in home entertainment will occur, due to the massive reduction of effort required for preparation. Larger in-home social gatherings will occur through web-based sharing of resource such as coop catering.

Winners: Mechanisms and software manufacturers, as more of both components will be in use. Repair services, as more complex elements will be in the home. Automated cabinet, refrigerator, food preparation, and oven manufactures. The general public will win significant

amounts of time, money, and space in the long term. Kitchen re-designers will be busy remaking the world's food spaces.

Losers: Old style cabinets/counters, dishwashers, stoves/ovens, and refrigerator manufactures will be left in the dust. Dish and food implement manufacturers that do not adapt to the new paradigm will become like the buggy whip manufacturers of old and go out of business. Fast food as well as many other restaurants will become less needed. They will start disappearing, just as many other types of store fronts have started to be replaced by web-based enterprises. Only social and entertainment based restaurants will remain and actually thrive as more leisure time becomes available for the larger community. Even food manufactures will feel a major squeeze, as home automated food processing starts migrating to preparation from fresh produce.

Automated Cleaning and Food Preparation



Autonomous cars are on the roads now and will hit the market around 2018! How will this affect your business (Part 2)?

So far we discussed the history and near future of Autonomous Vehicles and highlighted how the approaching change due to Autonomous Vehicles will be greater than that posed by the transformation from horses to cars.

We have also discussed how the advances being made with Autonomous cars can be applied to the food preparation industry, and how that will create a transformation as large as that posed by Autonomous Vehicles.

In both cases we also discussed which businesses will likely benefit and which will disappear. In this section we will discuss how autonomous vehicles will likely evolve in the five to fifteen year time frame and how that will further impact the business environment.

The primary variables to be aware of include whether your products and services are highly used and repetitive, and whether they can be replaced by simple to moderately complex actuators, sensors, and communications, as well as emerging complex computation systems.

As vehicles start driving themselves, and passengers are picked up and dropped off, with the vehicles going off to park themselves, the view of the vehicle will change. No longer will large parking complexes be needed in congested areas, vehicles will be able to park outside of those areas. No longer will long walks in winter be needed, as vehicles will be able to drop off at the door and then park a distance away. Vehicles will be able to take parents to work, then go back and take kids to school on their own. Idle vehicles will be able to help grandparents, friends, neighbors, and acquaintances out with owners needing only to click a button.

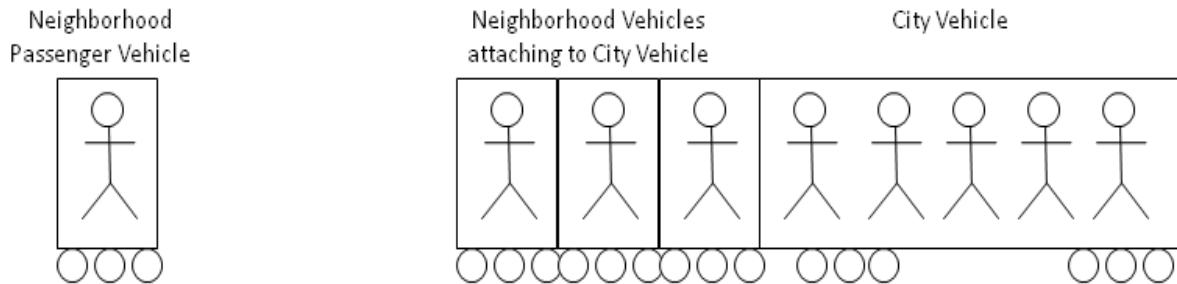
Currently, there are web sites where individuals can rent out their own vehicles. Integrating these sites with autonomous vehicles will be extensive, as the cost of getting the vehicle to and from renters will be nominal. As all this occurs, the concept of vehicle owner will experience a metamorphosis to vehicle (or transportation) user.

The need for universal type vehicles, those that can be used for many different purposes, will experience a dramatic drop as the cost of transporting vehicles to where they will be used becomes nominal. Vehicles for single individuals will be right sized (shrunk). When needed, vehicles for the whole family plus luggage, will appear within minutes via vehicle sharing sites.

Personal transportation services will likely emerge that provide annual services to meet all transportation needs for individuals and families. Providers will have sufficient vehicles in neighborhoods to meet logistic needs to insure only short minute waits for subscribers. Personal garages will be reclaimed as usable living space. Look to remodelers to benefit from this change.

Look for services to introduce different tiers of vehicles, such as neighborhood and city vehicles. As neighborhood vehicles will have different power needs, they may use alternative power sources such as electricity. When leaving the neighborhood, they may connect to larger vehicles that both charge them and tow them to another neighborhood for their next task. As vehicles evolve, passengers may be able to move from neighborhood vehicle to larger city

vehicles while in motion, allowing neighborhood vehicles to be more effectively reused, as they do not need to stay with passengers for the entire trip.



How will this affect the automotive industry? Average vehicle size and cost will likely drop moderately due to right sizing. Vehicle numbers will likely also drop moderately, as there will not be as many vehicles sitting idly. However, the largest impact will likely be felt by dealerships. As transportation users migrate away from managing their own equipment and towards services with assured delivery of transportation, individual purchases of vehicles will approach the level of horse purchases of today. With this most car dealerships are likely to disappear.

We discussed above how taxi, truck, bus, and many other professional drivers will start losing jobs in five years, and all but disappear in the following ten to fifteen years. We also mentioned the impact this will have on emergency rooms, jails, hospitals, insurance brokers, police, driving instructors, and others as 2 million drunk driving arrests, four hundred thousand injuries, and fifty thousand deaths disappear, along with the disappearance of the need for the government to manage personal vehicle operation activities.

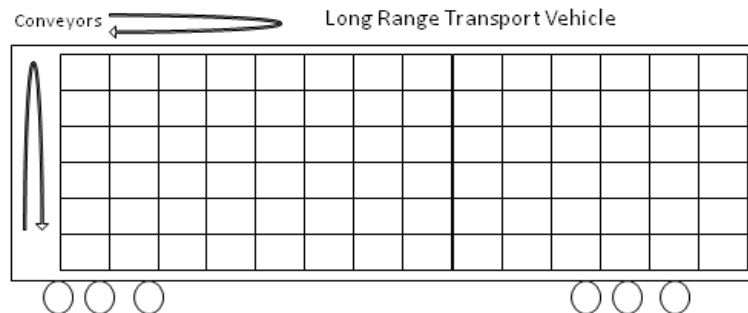
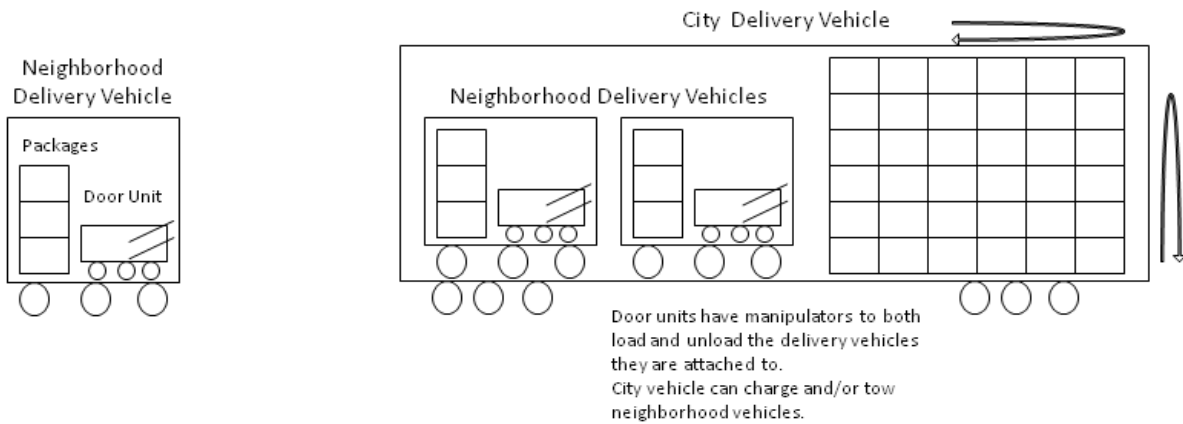
Transportation services will likely thrive. Those vehicle rental services that see this change coming and adapt ahead of time will likely be big winners. Likewise vehicle manufactures that prepare ahead of time will dominate the marketplace. Note that as dealerships and the marketing and selling of vehicles to individuals disappear and the size of vehicles shrink, the bar for entry into the vehicle manufacturing market will drop and new companies will enter the fray.

Public transportation will likely disappear as it will be replaced by private services that meet the needs of public transportation users effectively.

What about all of the delivery vehicle drivers, will they still be needed? While automated vehicles will not be able to deliver mail and packages, as with automated kitchens, delivery of packages and mail is a very common activity that at most would require simple to moderately complex actuators, sensors, and communications, along with emerging complex computation systems.

Similar to personal transportation discussed above, imagine city wide delivery vehicles that drop off and pick up neighborhood delivery vehicles, which themselves carry door units that can traverse steps, open gates, walk stairs, open mail boxes, drop off packages and mail, ring bells, knock on doors, and take pictures of delivered packages on doorsteps or in the hands of receivers.

City wide delivery vehicles will have conveyors, actuators, sensors, communications, and complex computation systems. Not only will they be able to transfer cargo to neighborhood vehicles, but they will also be able to connect to large range transport vehicles that are similarly equipped. This has the potential to dramatically reduce the need for warehouses as logistics systems become more and more intelligent.



Autonomous cars have already driven hundreds of thousands of miles! How will this impact the garden?

How will Autonomous Vehicles hitting the market in six to seven years impact other products, such as those in the garden? Years ago science fiction writers pictured vehicles being driven by androids. But this is not how vehicles are becoming autonomous. Instead sensors, actuators,

communications, and emerging complex computation systems are being added to make vehicles autonomous.

The first primary variable to be aware of is whether your products and services are highly used and repetitive. The other primary variables are whether simple to moderately complex sensors, actuators, and communications can be used along with emerging complex computation systems to handle the activity.

Care of lawns and gardens are a highly common activity. Further, the production of food which can be achieved via gardens is an even more highly common activity with incredibly high monetary worth. Many of the activities of lawn and garden care, including food production are well within reach of simple to moderately complex sensors, actuators, and communications used in conjunction with emerging complex computation systems.

Autonomous lawn mowers are already on the market. As more sophisticated sensors, communications and emerging complex computation are added to the mix, look for these systems to become more capable and prevalent.

Automated sprinkler systems likewise are already well entrenched in the market, albeit they are dumb. As sensors, communications and emerging complex computation are added, look to see these systems optimizing the amount of water needed to keep lawns in pristine condition and in order to reduce costs. No longer will users need to program the systems, the systems will use their sensors and knowledge of plant growth to keep every area of the lawn pristine. Customer investment in upgrades to their existing systems will be desirable due to the reduction of costs, upgrade in quality of lawns, and reduction in maintenance programming effort.

Add-ons for both of the above systems are likely to include fertilization and pest control. Specialized systems from fertilization and pest control are also likely to emerge. However, these systems will likely not be limited to just lawns. They will likely be extended to gardens and trees. Lawn irrigation systems (sprinkler systems) are already extended to gardens and trees. However there will be a significant enhancement in care and quality due to the addition of sensors, communication, and emerging complex computation.

Due to the high monetary value of food production, look for the emergence of food producing tree systems, and food producing garden systems. these systems will use the irrigation, fertilizing, and pest control systems discussed above. In addition, they will have additional components that:

1. Climb, prune and remove pests from trees.
2. Dig and plant gardens, as well as digging up of produced food..

3. Gather food lowered from climbing units, and from shorter plants, as well as trimming, pruning, and removal of pests of shorter plants.

Food is also now being produced in personal green houses and homes. There are specialized hydroponics systems for the growth of herbs, blueberries, bananas, tomatoes, mushrooms, as well as other foods on the market. Look for these systems to expand and start including more actuators, sensors, communications, and emerging complex computation. Look also to see the computation systems start communicating with food preparation systems for both the transfer of food stuffs as well as food need forecasts. These systems will likely start to do the planning of which foods to grow at which quantity levels. Harvesting and delivery units that take food stuffs to the food processing units will likely be common add-ons.

The food production industry will likely be the big losers in this evolution. As food production with greater freshness and more assured quality, will be done easily at home. Computational systems will be assuring quality via sensors. Winners will be those in smart lawn and garden system manufacture. Home remodeling and green house manufacturers will also likely win big.

Water usage will likely go down, which will hit water utilities moderately. There is the possibility that smart water collection will evolve with decorative cisterns around the yard being included as part of automated irrigation systems, further impacting the water utility industry.

Other losers will be those doing lawn and garden maintenance. Other winners will be those doing installation and maintenance of autonomous systems.

Summary

ITMM training is lightweight, in one day you feel comfortable in using a broad range of tools that can directly and immediately enhance your business.

Act now to feel the excitement of enhancing your business with technological advances across every process of your business. Go to theitmm.com/training to get started with NEW ITMM Leadership Improvement online training NOW!

Author information



Dr. Justin Coven has worked as an IT Enterprise Architecture, which is the art and science of creating enterprise level models of technology and associated business processes, for a number of major automotive corporations. With the IT Maturity Method Dr. Coven has expanded this art and science to Vendor Integration and Leadership Improvement, as well as advanced the associated rigor of tracking and measuring, tuning and advancing, and enterprise wide innovation.

