The ABCs of Construction Technology:
How the Best Do It Better

Brendan Abbott, Partner, ATX Advisory Services

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Session Outline

▸ Intro

▸ The ABC's of Construction Technology

  ▸ Overview core business functions and application models

  ▸ Benefits of technology

▸ How the Best Do It Better: Technology Maturity Stages

  ▸ Evolutionary stages for key components

  ▸ IT maturity scorecard

▸ How to Develop and Execute an IT Roadmap

  ▸ Technology roadmap process

  ▸ Considerations & action steps

▸ Questions and Answers

Introduction

Brendan Abbott, CPA

Founding Partner

Brendan runs the ATX construction industry vertical. He is a CPA, with an MBA in accounting and has over 25 years of experience leading accounting and technology service teams and engagements. In addition to his expertise in technology services, he is also an experienced provider of controller and CFO advisory services.

Brendan serves as a strategic advisor to high growth construction and facility services organizations looking to implement best practices and deploy world-class technology solutions. Brendan is the functional architect for the Caliper BI solution, a BI & Analytics platform for the construction industry.

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ATX Overview

Who we are
- ATX is a technology consulting firm founded in 2013
- Team of 25+ employees with operations headquartered in Biddeford, Maine
- Product agnostic technology advisors focused on software and data

What we do
- Solve complex technology problems using business centric approach
- IT Strategy, Selection, Implementation, Integration & Analytics
- Developer of *Caliper Construction Analytics* platform

Who we serve
- Dynamic businesses looking to scale, transform or improve
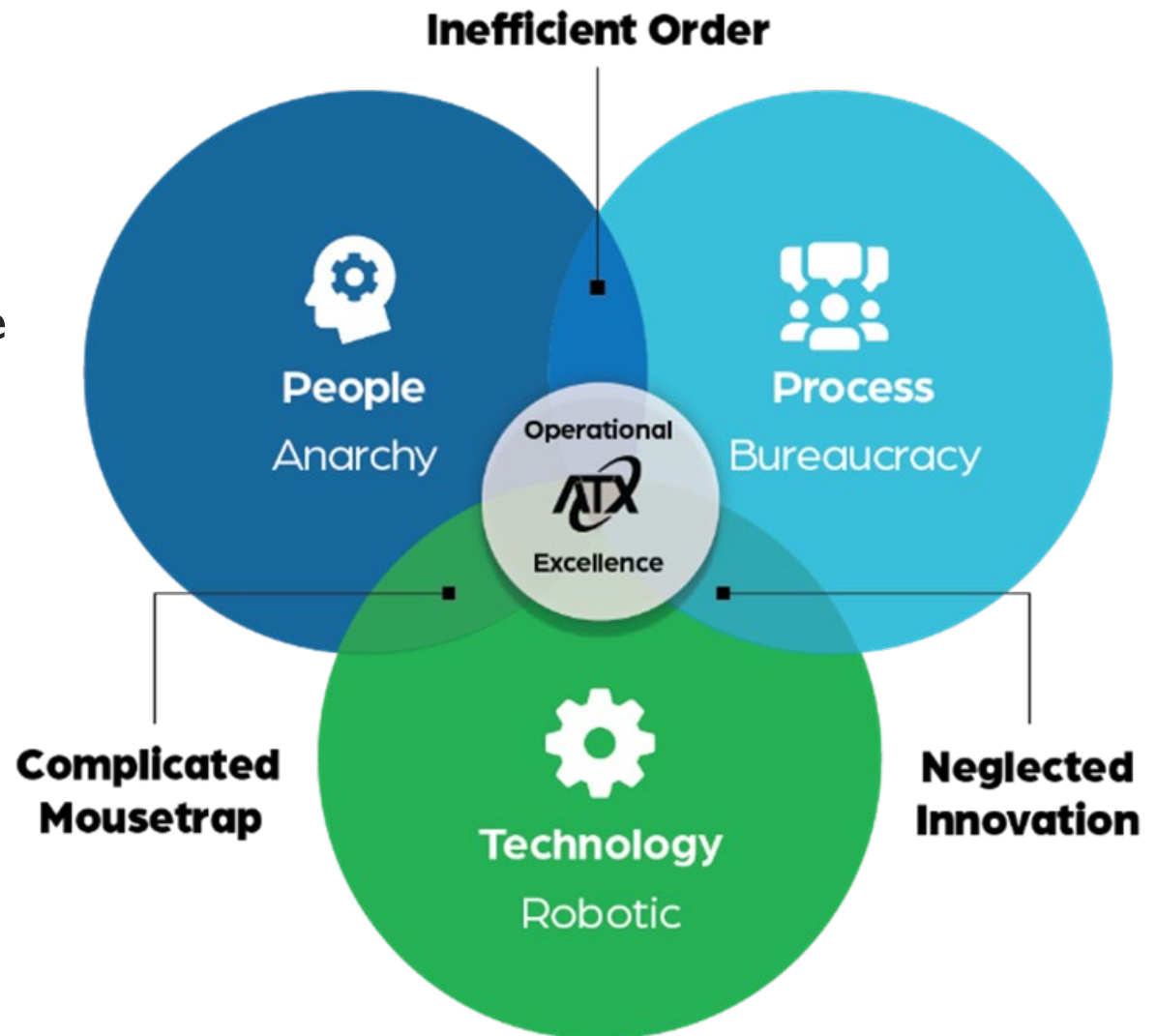- Construction, Facility Services, Professional Services, Manufacturing, CDFIs, and Nonprofits

ATX helps visionary companies simplify complex technology and data initiatives

5% OF ALL PROFITS ARE DONATED

The ABC's of Construction Technology

Operational Alignment

‣ People must be prepared and willing to adopt the process and technology changes being deployed

‣ Processes should be well defined, documented, while leveraging technology for efficiency and control

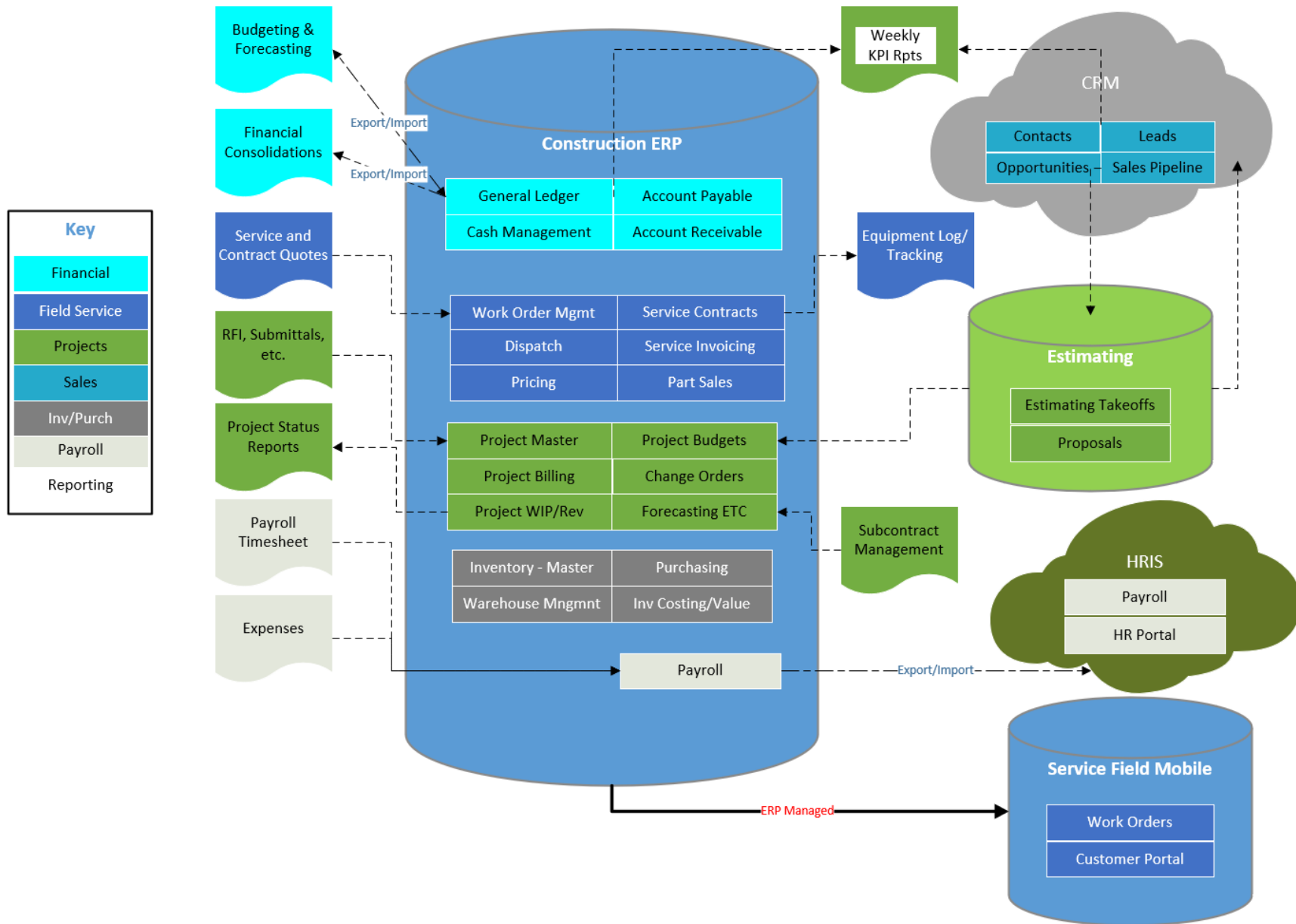‣ Technology should be fit for use, easy to use, scalable, and flexible to adapt

Inefficient Order

People
Anarchy

Process
Bureaucracy

Operational
ATX
Excellence

Complicated Mousetrap

Technology
Robotic

Neglected Innovation

Construction Processes and Functions

Financials: GL, AR, AP	Field Project Management	Payroll & Benefits	Bid & Pipeline Management	Job Cost/WIP
Auto CAD	Financial Consolidations	Fleet Management	Change Orders	Estimating and Take-offs
Subcontract Management	Reporting & Analytics	AP Automation	Project Forecasting	BIM
Purchasing & Inventory	Safety Management	Budgeting & Forecasting	Billing/AIA	Human Resources
Service Management	Contacts and Sales Activities	Warehouse Management	Document Management	Field Labor Management

Applications Alignment Example

Financials: GL, AR, AP	Job Cost/WIP	Change Orders	Billing/AIA	AP Automation
Service Management	Purchasing & Inventory	Estimating and Take-offs	Bid & Pipeline Management	Contacts and Sales Activities
Field Project Management	Subcontract Management	Field Labor Management	Project Forecasting	Safety Management
Budgeting & Forecasting	Financial Consolidations	BIM	Auto CAD	Reporting & Analytics
Human Resources	Payroll & Benefits	Fleet Management	Warehouse Management	Document Management

"Typical" Construction Application Environment

Key
- Financial
- Field Service
- Projects
- Sales
- Inv/Purch
- Payroll
- Reporting

Reporting outputs (left):
- Budgeting & Forecasting
- Financial Consolidations
- Service and Contract Quotes
- RFI, Submittals, etc.
- Project Status Reports
- Payroll Timesheet
- Expenses

Construction ERP

| General Ledger | Account Payable |
| Cash Management | Account Receivable |

Work Order Mgmt	Service Contracts
Dispatch	Service Invoicing
Pricing	Part Sales

Project Master	Project Budgets
Project Billing	Change Orders
Project WIP/Rev	Forecasting ETC

| Inventory - Master | Purchasing |
| Warehouse Mngmnt | Inv Costing/Value |

Payroll

External systems (right):
- Weekly KPI Rpts
- CRM
  - Contacts
  - Leads
  - Opportunities
  - Sales Pipeline
- Equipment Log/ Tracking
- Estimating
  - Estimating Takeoffs
  - Proposals
- Subcontract Management
- HRIS
  - Payroll
  - HR Portal
- Service Field Mobile
  - Work Orders
  - Customer Portal

Export/Import
ERP Managed

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Why Invest in Technology?

▸ **Improve customer experience & satisfaction**

  ▸ Sell more business, retain clients

▸ **Improve employee experience & satisfaction**

  ▸ Boost morale, retain and attract new employees

▸ **Improve process efficiency and enhanced productivity**

  ▸ Get more done with less overhead cost, more time for value-add activities for key team members

▸ **Reinforced and well-informed decision making**

  ▸ Sell more, avoid mistakes, capitalize on opportunities

> The return is boosted productivity and profitability

Benefits of Technology Maturity

Executives say the top benefits of technology transformation are improved operational efficiency (40%), faster time to market (36%) & the ability to meet customer expectations (35%).

2019 - Forbes - 100 Statistics on Digital Transformation

Data-driven organizations are 23 times more likely to acquire customers, six times as likely to retain customers, and 19 times as likely to be profitable as a result.

2020 - McKinsey Global Institute - Growth, Marketing & Insights

Insights-driven businesses are growing at an average of more than 30% each year, and by 2022, they are predicted to take $1.8 trillion annually from their less-informed peers.

2021 Forrester Insights-Driven Businesses Set the Pace for Growth

How the Best Do It Better: Information Technology Maturity

Construction Technology Maturity Continuum

Stage 1

No Enterprise Systems

Stage 2

Select & Implement Core Systems (ERP, Estimating)

Stage 3

Select & Implement Secondary Systems (Forecasting)

Analytics

Stage 4

Integration

Advanced Analytics

Stage 5

Automation

Rudimentary

Repeatable

Defined & Measured

Well Managed

Optimized

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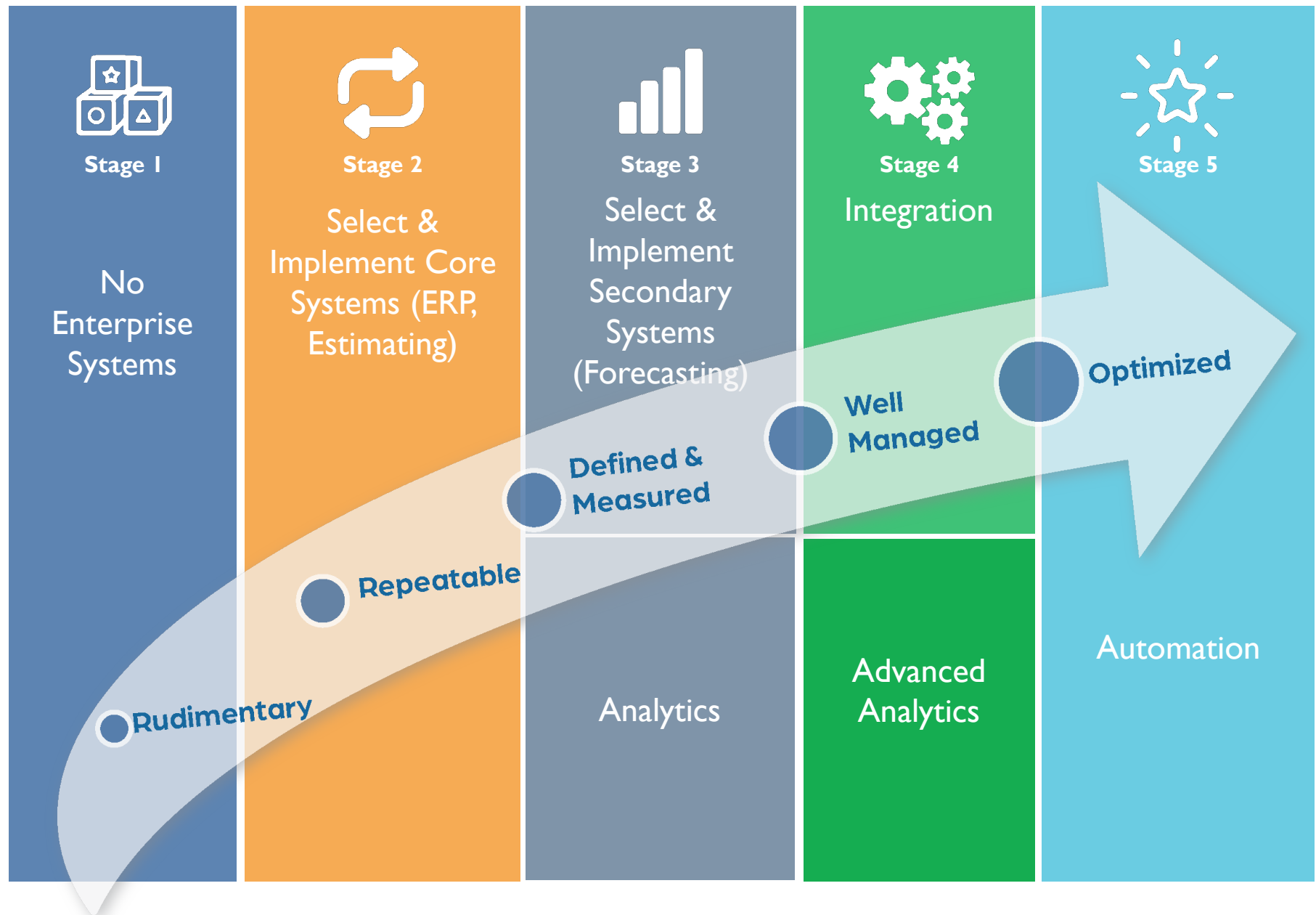
Technology Maturity Components

Software Applications

Integrations

Data Quality & Analytics

Strategy & Governance

Security & IT Capabilities

User Experience & Attitudes

IT Maturity
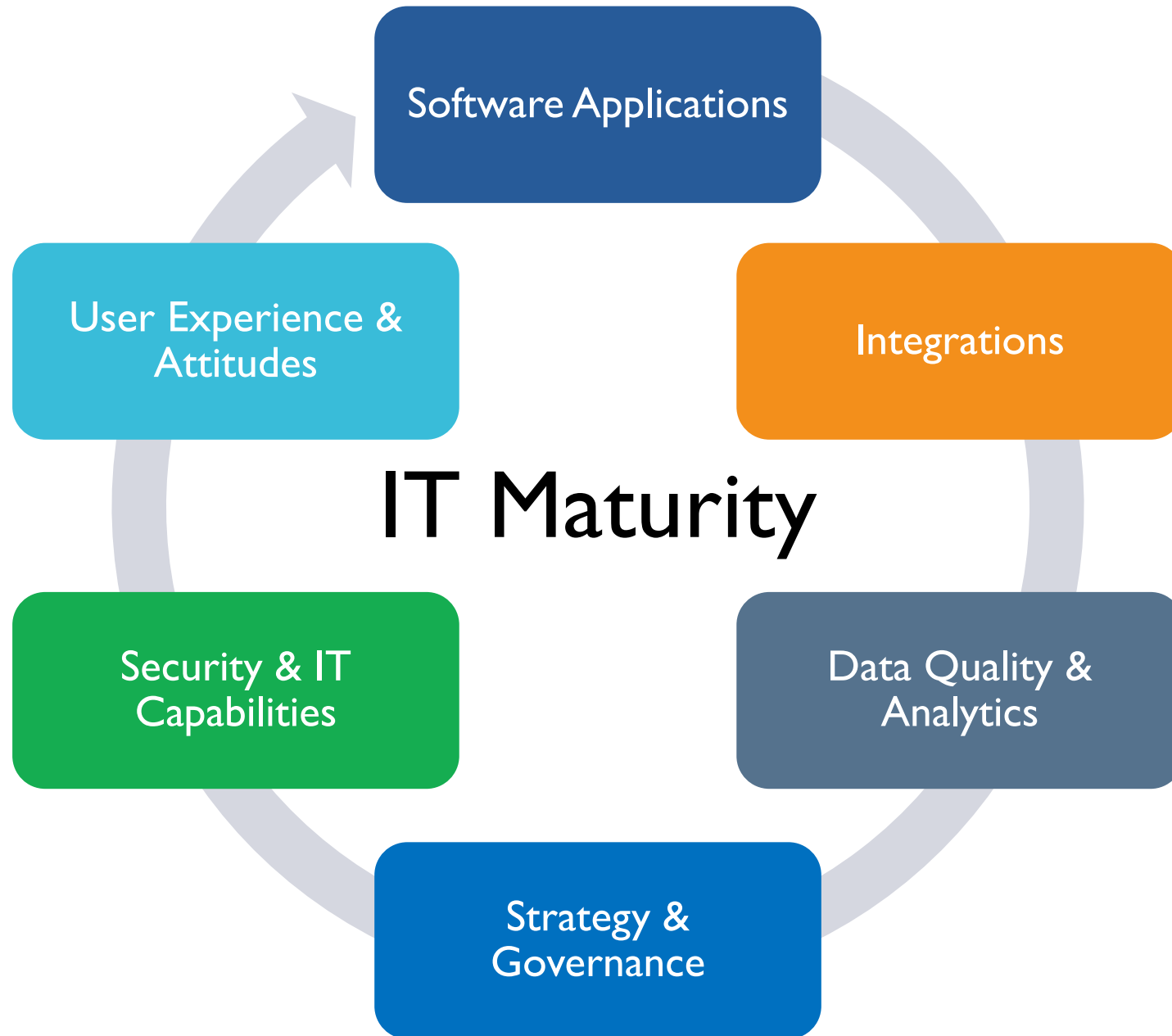
Business Software Applications

Software applications are computer programs that are designed to carry out specific tasks and business functions. They are also critical to data capture. The underlying technologies, aggregation of functions, and features vary significantly.

Stage 1
Rudimentary

- Paper & Pencil, Excel, QuickBooks, MS Word, some shared network drives

- Forecasting is manual, sporadic or non-existent

Stage 2
Repeatable

- Project centric ERP for major functions like job cost & accounting

- Still heavy use of excel for data capture

- Network drives for documents

- Manual forecasting large jobs

Stage 3
Defined & Measured

- Expanded use of CRM, Bid Mgmt., Sales pipeline tools

- Core systems implemented: field operational applications

- Use of forecasting tool for all jobs, pulls current actuals

- Manual analysis

Stage 4
Well Managed

- No siloed data

- Use of workflow automation tools

- Enterprise Doc. Management

- Analytics platform deployed

- Fully automated forecasting tool

Stage 5
Optimized

- Open architecture of technology platforms allows for full integration of best-of-breed applications

- With use of AI, begin to suggest mitigation steps based on forecasted results

Integrations

Integrations ensure that your organizations data is clean and accessible between applications. They are significant factor for efficiency and data quality. There are various tools available to assist with integrations from .csv import to web services

Stage 1
Rudimentary

- No Integrations

- Data is manually keyed between systems if at all

Stage 2
Repeatable

- Systems are able to export and import into one other through manual download/upload process

- Alternatively, processes exist to ensure data is consistent between core applications
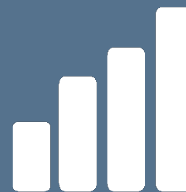
Stage 3
Defined & Measured

- Core systems have automated integrations, executing on a trigger/recurring schedule

- Ancillary systems have one-way push/pull of data to downstream applications

Stage 4
Well Managed

- Data from systems are connected to data warehouse and informs reporting software

- Optimized to scale to new markets and products

- Bidirectional integrations exist, where necessary

Stage 5
Optimized

- All systems integrated and automated, utilizing additional tools (RPA) & applications that further automate processes

- Use of integration platforms (iPaaS) enabling governance of integrations across all systems & multi-organization

Data Quality & Analytics

Best known as GIGO - data quality is crucial to IT maturity and a pre-requisite to developing analytics capabilities. Analytics is the process of discovering, interpreting and communicating patterns of data

Stage 1
Rudimentary

- Limited controls over data exist

- No organization of thought around data collection

- No capacity to interpret data in a meaningful way; ad hoc and reactive reporting done in Excel

Stage 2
Repeatable

- More applications allow for more consistent quality of data collected

- Some system-based controls on data and required fields

- Manually generating some standard financial and operational reports for management
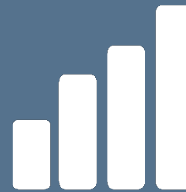
Stage 3
Defined & Measured

- Key data fields are validated through the operational processes

- Data is periodically reviewed & checked for accuracy

- Report generation across all business lines
- Some reports are automated

Stage 4
Well Managed

- Integrated systems create quality data

- Automated data quality reporting

- Utilize BI platform for visualizations of next level analysis and content

- Automation of some KPIs and weekly reports

Stage 5
Optimized

- Data collection is full automated and checked for quality

- Dynamic reporting allows for instant access to required data in any format

- Prescriptive BI

- Fully automated KPI reporting & alerts

Strategy & Governance

Strategy & governance focuses on aligning technology with business needs. Core concepts are strategic alignment on technology, prioritization of needs, delivering value, allocating resources, minimizing risk, and performance management

Stage 1 Rudimentary

- Very few digital processes in place

- The company executes functions based on individual effort

- Siloed business functions

- No governance around IT investment

Stage 2 Repeatable

- Coordinated information sharing between business processes

- No IT strategic plan exists
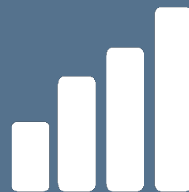
Stage 3 Defined & Measured

- IT Strategic plan exists

- Data and system requirements are considered at a holistic level to maximize efficiency and reporting capabilities

Stage 4 Well Managed

- Technology now serves the strategy of the organization in delivering its services, mission, and message

- IT Strategic plan is reviewed and updated annually

- All IT initiatives are well defined & managed

Stage 5 Optimized

- Technology is represented as a thought partner by leadership

- Use of ITAM – IT Asset Management Systems tracks and established a PMO (Program Mgmt. Office) underlying all technology apps and intitiaties

Security & IT Capabilities

Company core business integrity and client information protection are critical to business operations. Data breaches can set organizations back. Having partners and or in-house expertise to manage and secure systems environment is a must.

Stage 1
Rudimentary

- Sensitive data stored on open platforms with all employees having access

- Limited or no IT support

Stage 2
Repeatable

- Use of SharePoint or other systems to securely store data

- Company and client communication secured

- Use of MSP or hire in-house IT

- Identified super users for key platforms
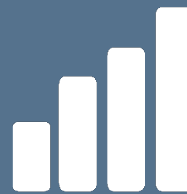
Stage 3
Defined & Measured

- Standard operating procedures (SOP) for handling data collected & created by the organization

- Training on security protocols

- Managed services infrastructure support
- Internal business analyst function

Stage 4
Well Managed

- Multi-factor (MFA) authentication, end point encryption

- Internal testing on security protocols

- Robust business analysis function or dedicated data systems manager

- CISO / IT Security support
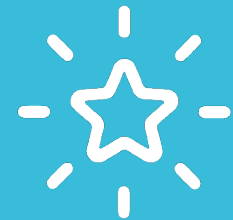
Stage 5
Optimized

- Security compliance reviews completed by external audit on a regular basis including penetration testing

- In-house IT with development capabilities for Robotic Process Automation (RPA), configuration and other technologies

User Experience & Technology Attitude

User experience, both and internal, and technology attitudes influence how well technology is implemented and utilized through all constituents. Training, leadership and change management are crucial to moving through the stages.
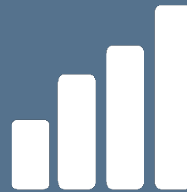
Stage 1
Rudimentary

- Manual
- Reactive
- Technophobic

Stage 2
Repeatable

- Use of system job costing and billing to end clients
- Manual project status reports
- Openness to using technology to simplify and reduce duplicate entry
- Minimal trust in systems and data

Stage 3
Defined & Measured

- Customer portals
- Project status reports, and other documentation is automated
- Increasing comfort with technology and focus on training
- Looking to increase efficiency

Stage 4
Well Managed

- All communication through PM portal. Process is easy and simple users
- Key reporting available on all projects
- Aligned on strategy to simplify business processes and support operations through analytics
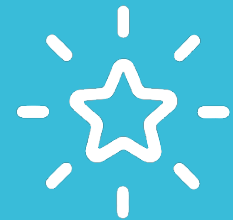
Stage 5
Optimized

- Seamless & transparent client experience
- AI and automations speed up & improve project status reporting (weather, live cams, IoT)
- Technology is now symbiotic part of organization wide operations

IT Maturity Scorecard

	Rudimentary	Repeatable	Defined & Measured	Well Managed	Optimized	Current State Notes	Improvement Opportunities
Software Applications & Forecasting			12 Mo			• Construction ERP in place • Project field tool w/ siloed data • Estimating and sales all offline • Forecasting is manual and sporadic	• Evaluate & implement "CRM" type system • Forecasting tool and consistent processes
Integrations		6 Mo				• Manual download/upload process for payroll, all others are manual, dual entry	• Date warehouse to pull siloed data together • Integrate won bids to projects • Sync project field tool
Data Quality & Analytics		9 Mo				• Ad hoc and reactive reporting • Weekly KPI's in Excel • Inconsistent data entry from field	• Evaluate and implement analytics platform • Improve data validation at point of entry in core systems, fields
Strategy & Governance		6 Mo				• IT Strategic plan exists • Some users dominate IT resources	• Annual review and update of plan • Elevate technology needs in C-Suite
Security & IT Capabilities		12 Mo				• Uses managed service provider • Super users in organization	• Security training • Develop SOP for handling sensitive data
User Experience & Technology Attitude		6 Mo				• Users looking for technology opportunities to increase efficiency and effectiveness.	• Involve managers into IT planning and align needs, deploy analytics to identify opportunities

Well Managed Application Environment
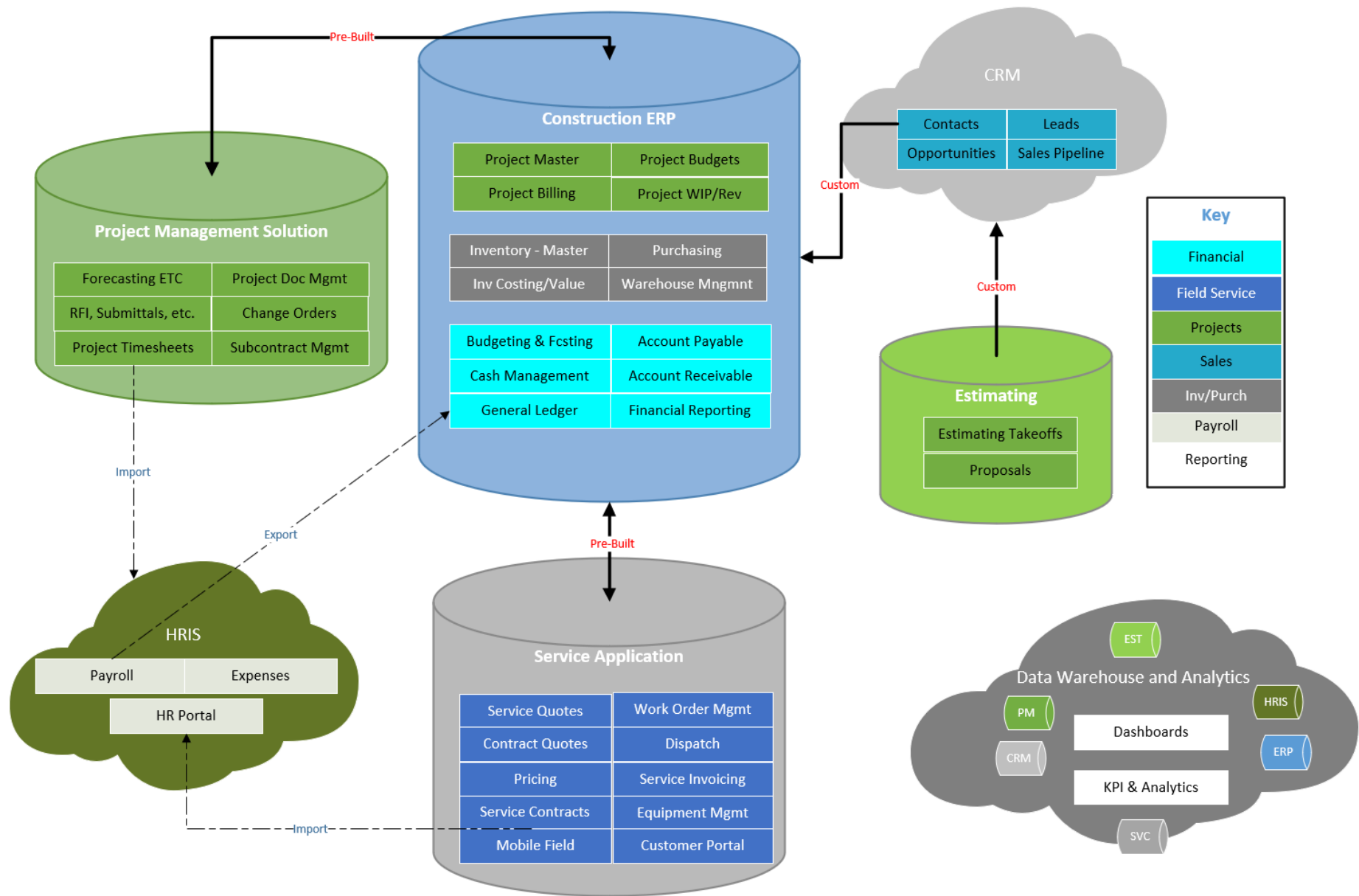
How to Develop and Execute on an IT Systems Roadmap

What is an IT Systems roadmap?

▶ An effective IT roadmap identifies current IT capabilities, projected IT needs, and any improvements you plan to make to execute against your business strategy

Roadmap Strategy Process

Discovery	Analysis	Plan Development

Discovery
- Establish project schedule
- Meet with client executive management to understand the organization's strategy, objectives, and vision
- Review existing documentation and materials on current state
- Inventory current technology and understand current IT support environment
- **Interview key team members and conduct facilitated workshops to understand business process, flow of information, desired future state operating process, key measures, and reporting needs**

Analysis
- Evaluate current application infrastructure to understand current gaps and opportunities for future state environment
- Compare existing operations and processes to leading practices
- Document key gaps related to areas of weakness and begin to formulate a plan to resolve issues
- **Identify, prioritize, and document future state system requirements**
- **Identify potential alternatives to operating processes, technology, and reporting environment**
- Gather budgetary data and evaluate ongoing support models for solutions being considered

Plan Development
- Evaluate alternatives against defined, client-specific criteria
- **Identify pros and cons associated with alternatives presented**
- **Finalize and document key recommendations related to people, process, and technology**
- Develop a high-level roadmap to achieve agreed upon desired future state
- Present findings and recommendations to key stakeholders
- Determine next steps with key project stakeholders

> Take a collaborative, multi-step approach to developing a plan that can be successfully implemented.

Additional Considerations

▶ Which platforms:

  ▶ Will help you mature?

  ▶ May be obsolete in the near-mid term?

  ▶ Are best for your organizational size and product offerings?

▶ How prepared is your team for change?

▶ Who will lead the effort?

  ▶ What resources are you willing to dedicate?

▶ How will you support systems once implemented?

Why is Technological Change So Hard?

- **People**
  - Limited internal IT resources and capabilities
  - Staff working at or over capacity already
- **Process**
  - Siloed departments and business functions can make collaboration difficult
  - Overcoming "the way it's always been done"
- **Technology**
  - Technology intimidation
  - Industry technology limitations
- **Budget / Funding requirements**

There is no silver bullet!

Getting Started

▸ You need to start somewhere

▸ Have a plan

  ▸ Figure out how far you want to go and by when

  ▸ Align technology plan with your organizations mission and vision

▸ Attain buy in from key staff, leaders, and board members

  ▸ Consider an IT and Business Processes assessment before selection and implementation

▸ Understand needs and limitations

▸ Utilize your network

Take away:

Don't let perfection be the enemy of progress!

We have yet to encounter a Construction organization in the optimized state

We recommend defining a plan to get to the well managed state

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Questions?

Our Values

Practical Insights

Exceptional Service

Lasting Relationships

Continuous Improvement

Positive Impact

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