OPERATIONS AND SUPPLY CHAIN MANAGEMENT

Group Paper: Hypothetical Contractor Inc.

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March 20, 2012

EXECUTIVE SUMMARY

Over the past 5 years, Hypothetical Contractor Inc. (HCI) has grown from start-up to just over a half billion dollars in revenue. This growth has been fuelled by a small number of high-value contracts, primarily in the Fort McMurray region. Revenue growth has slowed considerably in the past 12-18 months, and the company is at risk of contraction. Specific issues facing the company include:

- Dis-economies of scale as new contracts require additional overhead personnel and supporting facilities.
- Challenges in forecasting resource demand resulting from a larger number of shorter-term contracts.
- Evolving requirements for skill-sets outside of HCI's traditional core-competencies.
- Degradation of service quality resulting from leaner operations teams and geographic expansion, where personnel do not have ready access to support.
- HCI is missing opportunities to maximize revenue, by offering Professional Services at below market value in some circumstances.

After review, this team recommends the following actions be undertaken to ensure continued operational success and future growth of HCI:

1. Create a limited number of regional hubs to serve as focus areas for growth and to regain economies of scale.
2. Leverage existing knowledge and datasets to predict demand based on industry past performance and aggregate forecasts.
3. Establish a strategic partnership with companies that can offer complementary skill-sets to expand HCI's service offerings and/or access to additional markets.
4. Detail core business processes to serve as a foundation for Total Quality Management. Pursue ISO 9001:2000 certification for said processes.
5. Implement a yield-management policy, offering professional services (eg: planning and scheduling personnel) at higher gross margins where services are not undertaken in conjunction with high-volume labour activities (eg: construction or maintenance execution).

By undertaking these operational changes, we expect HCI to position itself well to support future growth in an efficient, yet effective and sustainable manner.

RELEVANT COMPANY INFORMATION

Hypothetical Contractor Inc.[1] (HCI) provides labour and small project execution to the heavy industrial sector across Canada. Clients consist of major oil & gas, petrochemical and mining companies located primarily within Alberta (and specifically concentrated in Fort McMurray), but with a small number of clients elsewhere across Canada. The company was started as a privately held business approximately 5 years ago, at the peak of the Alberta economy. Revenues in the first 12 months of operation were approximately $150M and have since grown to approximately $500M / year. Contribution margins vary according to the type of contract and commercial model in place at each site; average gross margin is between 8% and 10%.

Core service offerings from HCI consist of both field labour (pipefitters, boilermakers, labourers, etc.) and professional services (maintenance management professionals, sub-contractor and logistics management specialists, etc.). Generally, service offerings are bundled together such that HCI provides a holistic package ranging from scope development and detailed planning through field execution and supplier management. Commercially, margins have been set based on an expectation of high-volume labour hours associated with the provision of field labour, rather than a higher margin that would normally be set for comparatively low-volume professional services.

Operationally, HCI is divided into Business Units aligned with each of the major clients each of which will consist of one or more operational sites. Within each Business Unit, there is a complete operations management team led by a single Business Unit Manager, supported by one or more functional teams. Business Unit performance is judged based on a combination of factors including Gross Margin, Health and Safety results, Revenue Growth and Continuous Improvement.

HCI is also divided into a number of separate legal entities, which provides a degree of flexibility with respect to labour strategy. In particular, field labour is executed through one of two subsidiary companies. HC-Integrated Ltd. provides unionized labour through the national labour unions and comprises approximately 90% of HCI field labour revenues. NHC Inc. offers non-unionized ("merit shop") labour for client sites and regions where collective agreements are not in effect.

Initial growth at HCI was fuelled by the acquisition of a small number of high-value contracts. Over the past year, however, growth has plateaued as the number of such large contracts within HCI's target market has dwindled. The growth strategy for HCI has therefore shifted to smaller, shorter-term contracts, new market locations and additional lines of service. (eg: Work now includes Electrical and Instrumentation scope, where it previously included only Mechanical work scope.)

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[1] Company name and key figures have been changed for confidentiality reasons.

Recently, competitors have begun to emulate some of HCI's key market-differentiators in a *straddling*[2] approach. Further, the innovative commercial model (a combination of alliance relationship and *balanced score-card*[3] with contractor profit at risk) first introduced by HCI has been slow to gain acceptance with new clients. Several existing clients have also elected to renegotiate contract terms to a more traditional contract approach, wherein the client plays a greater role in the service delivery with a leaner contractor organization.

ISSUE IDENTIFICATION

HCI currently faces the following issues:

- The combination of smaller contracts and new locations has placed strain on HCI, owing to *diseconomies of scale*[4] associated with the additional overhead requirements to support new growth.
- Shorter contract terms necessitate reliable demand forecasting and a more flexible workforce in order to maximize resource utilization.
- New lines of service require that HCI expand its core competencies to include additional skill sets.
- Quality of service delivery has degraded through the adoption of leaner operations teams and wider geographic spread of the organization.
- Provision of Professional Services at reduced margins represents missed revenue opportunities where not accompanied by craft field labour.

DEFINITIONS

HCI's quick growth of the company has now plateaued. In order to continue growth in today's market they need to review their operations and supply chain management, which is the design, operation and improvement of the systems that deliver the firm's primary products and services. Through business process reengineering type approach they can seek innovations in the processes by which they run their operations. They can re-analyze their organization and all of its business processes, and eliminate those that did not add value.

The supply chain processes include planning, sourcing, making, delivering and returning. With respect to planning, HCI needs to better determine how to anticipate demand, and how they can meet that forecasted demand with their available resources. They need to develop a set of standards and benchmarks to monitor the supply chain, so that it is efficient and delivers high quality and value to their clients. HCI's sourcing issues relate to their section of suppliers/employees that deliver the goods and services. A review of HCI's supply chain process should include an assessment of their scheduling processes for workers. They already have criteria in place to measure their individual business units, but they can include measures for speed, quality and worker productivity. The delivering aspect of HCI needs to be studied, to develop and operate an efficient movement of services and goods throughout their locations.

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[2] Straddling: "When a company seeks to match the benefits of a successful position while maintaining its existing position." (Jacobs & Chase, 2011)

[3] Balanced Scorecard: An attempt to reflect the particular needs of each stakeholder group in a performance measurement system. (Jacobs & Chase, 2011)

[4] Diseconomies of Scale: At some point, as volume increases, average unit cost increases. (Jacobs & Chase, 2011)

HCI has built its service activities into its product offerings, known as servitization. They are also straddling, seeking to match the benefits of a successful position, while maintaining its existing position. They provide the professional services, and all aspects of field labour to their clients. They have also added new lines of services, and expanded their core competencies to include additional skill sets. This may not be the best approach when compared to focused firms, as they tend to generate lower profits as a percentage of revenues. They are often unable to generate revenues or margins high enough to cover the additional investment required to cover service-related costs.

HCI can evaluate which lines of services it can deliver the best, and which are critical to the firm's success, and the concentrate the firm's resources on these activities. HCI needs to reanalyze what core capabilities/competencies differentiate themselves from its competitors. By mapping their core competencies into an activity-system map with the capabilities they choose as the most effective to delivering value to their customers, they can then tailor their activities to those operations.

Some of HCI's activities, services and decision responsibilities could be moved to outside providers through an outsourcing strategy. This would allow HCI to concentrate on their core competencies, creating a more competitive advantage at the same time as reducing their costs. They will also improve the quality and perceived value of their services, and the productivity, effectiveness and flexibility of the organization.

HCI should evaluate the trade-off between efficiency and effectiveness, and what would provide the most value to their clients. A value analysis can be done to simplify their processes. This will facilitate lowers costs, while maintaining value to their clients, by delivering the functional requirements they want. A significant issue in modifying an existing service is fit and HCI should determine the answers to the general factors for determining fit;

- The Service experience fit
- The Operational fit
- The Financial impact

HCI can also determine the complexity and divergence of the services they offer, relative to their basic service process. Complexity is the number of steps, and possible actions involved in each step. Divergence is the number of ways that the client/service interaction could vary at each step. This can be used to determine different or non-required resources, such as worker skills, layout, and process controls.

HCI also needs to take into account their capacity, and best operating level. That is the attainable rate of output they can achieve, and the level of capacity for which the process was designed and the volume of output at which average unit cost is minimized. Currently HCI is experiencing a diseconomy of scale. The size of the operation has become too large, and maintaining the demand required to keep the organization busy is becoming difficult. The capacity of HCI's organization is currently very flexible in its processes and its workers. Considerations in changing capacity include:

- Maintaining system balance – variability in service demand and the processes involved may lead to an imbalance
- Frequency of capacity additions – expense involved in upgrading or downgrading services

- External sources of operations and supply capacity – is it cheaper to utilize an existing source of capacity
- Decreasing capacity – due to decreased demand is a consideration, but can create significant problems.

To determine their capacity requirements, HCI needs to evaluate the following steps:

- Use forecasting techniques to predict demand for their services
- Calculate equipment and labour requirements to meet service forecasts
- Project labour and equipment availabilities required

Service capacity is more time- and location- dependent, and it is subject to more volatile demand fluctuations, and utilization directly impacts services quality. Time needs to be considered as one of HCI's supplies. The capacity must be available to produce their services when they are needed. Their service capacity must be located near their clients. Because services cannot be stored, the volatility of demand needs to be constantly evaluated. Services need to be readily available, altered to individual client service needs, and the time requirements associated with those services. The yield management process would allow HCI to allocate the right type of capacity to their clients at the right price and time, to maximize revenue.

To determine their future demand needs HCI needs to forecast based on their past demand. A time series analysis would allow them to relate past demand to predict their future demand. They would also be able to include seasonal influences, which relate specifically to the organization. A linear regression forecast would be the appropriate time series analysis to use, as it assumes that past data and future projections would fall about a straight line. HCI could also use a qualitative technique to forecast their demand. They could include a combination of clients, managers and employees to forecast demand for their services. The Delphi method would be appropriate to use, as it would conceal the identities of those participating in the study, and apply an equal weight to each persons' opinion. This would prevent employees or clients from feeling threatened or not contributing, due to the management of HCI being present. It will also ensure that more weight will not be given to the management opinions.

They can also utilize a Service-System Design Matrix, identifying common alternatives to the organization, and values them based on degrees of client contact, the logical marketing proposition and the production efficiency. The matrix can be used for HCI's operations and strategies. The operational use would identify worker requirements, focus of operations, and innovations. The strategic use would include:

- Enabling of systematic integration of operations and marketing strategy, which would clearly show HCI's trade-offs.
- Clarify exactly which combination of service delivery HCI is providing.
- Permit comparison with how other firms deliver specific services, which would enable HCI to isolate their competitive advantage.
- Indicate evolutionary or life cycle changes that might be required as HCI grows.

By using a service blueprint HCI can enhance their service process design. A service blueprint breaks down operations into four stages:

- Stage 1: Preliminary Activities

- Stage 2: Problem Diagnosis
- Stage 3: Perform Work
- Stage 4: Billing and Retrieval

A basic blueprint would describe the features of HCI's service design, but would not provide the direction needed to make their process conform to their design. To solve this problem, HCI would need to apply poka-yokes. Poka-yokes are procedures that prevent mistakes from becoming defects. By using the service blueprint, HCI can identify poka-yokes to be applied to fail-safe the actions of the client, as well as of employees. Poka-yokes can be classified in the form of warning methods, physical or visual contact methods, or by the Three T's:

- the Task to be done
- the Treatment according to the customer
- the Tangible or environmental features of the service facility.

Once HCI decides what services it wants to deliver to add the most value to their clients, they need to measure their performance. They can measure their productivity, the ratio of their outputs to inputs, and efficiency, the ratio of actual outputs to a standard measure. They can calculate their run times, setup times, operations times, and flow time related to the services they provide, and use these measures to evaluate their speed and productivity. To reduce their flow time they can analyze a couple of options:

- Perform activities in parallel
- Change the sequence of activities
- Reduce interruptions

HCI can apply the international standards for quality management and assurance to all of their operations design, installation, and servicing operations. These are known as ISO 9000, and can prevent defects by applying these standards at every stage of business. The ISO documents provide detailed requirements for meeting these standards, and provide standard tools to improve quality in an organization. The ISO 9000 standards are based on 8 quality management principles, relating to the following areas in an organization:

- Customer focus
- Leadership
- Involvement of people
- Process approach
- System approach to management
- Continual improvement
- Factual approach to decision making
- Mutually beneficial supplier relationships

To ensure ongoing efficient movement of services and company practices, HCI should also develop external benchmarks. They can look outside their company to examine what excellent performers inside and outside the company's industry are doing in the way of quality. They can then use this data to compare against their own, and identify processes needing improvement.

PLAN OF ACTION

ECONOMIES OF SCALE

With expansion beyond the Fort McMurray primary market, HCI has experienced the phenomena of dis-economies of scale. Facilities and personnel situated in northern Alberta are ill-suited to support work across the whole of Canada. In particular back-office functions such as time-entry staff, procurement and supply chain management, and senior operations manager roles are necessary to support each new region but are not fully utilized with the smaller contracts now being tendered

In order to maximize operational efficiencies, we propose to establish a small number of regional hubs to support growth over the intermediate term. Where possible existing staff will be centralized into the new hub in order to maximize organizational efficiency. By focussing growth on a limited number of markets, supported by a regional office, we expect to minimize overhead expenses associated with future growth (and thereby maximize profitability). Additional offices can be added in new locations, once the business is ready for further growth.

In collaboration with Business Development, the location of these hubs will be chosen using a Factor-Rating System considering the following factors:

Factor	Range
Potential new client sites within 200km • # of clients, weighted by annual revenue potential	0-500
Existing client sites within 500km • # of clients, weighted by annual revenue potential • Expected benefits of consolidating operations into one hub	0-200
Ease of access to major airports • <75km distant, and/or • Frequency / duration / cost of connecting flights	0-100
Availability of labour • Skilled labour pool available • Existing vs. new collective agreements with local unions	0-50
Host community • Subjective evaluation of host community • Ease of cultural integration	0-50
Communications infrastructure • Cost and accessibility of high bandwidth internet connections • Mobile coverage in area	0-25

Proposed locations consist of: Edmonton, AB; Calgary, AB; Burnaby, BC; Moose Jaw, SK; Sarnia, ON; Saint John, NB and Saint John's, NFLD. Evaluation of these locations will be undertaken separately, based on the criteria outlined above, with the input from Business Development. For screening purposes, the review team has prepared a preliminary assessment, as outlined below. Based on these results, we believe that regional offices in Edmonton and Sarnia present the greatest value to the organization at this time.

Factor	Min	Max	Edmonton	Calgary	Burnaby	Moosejaw	Sarnia	Saint John	Saint John's
New Client Sites	0	500	500	40	200	175	250	125	100
Existing Client Sites	0	200	200	0	0	0	125	0	0
Ease of Access to Airports	0	100	100	100	100	25	50	25	25
Availability of Labour	0	50	50	50	25	15	50	15	15
Host Community	0	50	40	50	50	30	20	40	35
Communications Infrastructure	0	50	50	50	50	40	50	50	30
		Total	940	290	425	285	545	255	205

OUTSOURCING

"Two organizations may enter into a contractual agreement involving an exchange of services and payments. Outsourcing thereby helps the firms to perform well in their core competencies and thus mitigating rise of skill or expertise shortage in the areas where they want to outsource… …In truth, outsourcing is a no-brainer. To be able to keep core competencies in house, shed balance sheet assets and boost return on capital just by employing the services of third parties seems to be a straightforward and easy decision. The tricky part is distinguishing what exactly the core competencies of the company are and which non-core activities to outsource." [5]

The concept of outsourcing certain tasks to third party vendors who offer specialization and perhaps a lower cost is a practice that has gained steam in the last few years.

As part of the strategy to stimulate the recently stalled growth of HCI, the option of outsourcing becomes a viable tool to implement for many reasons. The benefits can be broken down into three main business objectives (adapted from Jacobs and Chase):

Financially Driven
   • Gain access to new markets
   • Reduce costs through a lower cost structure

Improvement Driven
   • Improve quality and productivity
   • Obtain expertise, skills & technologies not available in house
   • Improve credibility & image by associating with superior providers

Organizationally Driven
   • Improve effectiveness by focusing on what the firm does best (capability sourcing)
   • Increased flexibility to meet changing demand of services
   • Increased product and service value by improving response to customer needs

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[5] Outsourcing. (Jacobs & Chase, 2011)

Considering these aspects, we recommend that HCI identify one or more candidate companies with whom to form a strategic partnership in pursuit of growth. Ideal candidates will meet the following criteria:

- Experienced in provision of Electrical and / or Instrumentation work, with capacity to support both field labour and work scope planning. This offers HCI access to skill-sets that are currently outside the company's core-competency.
- Hold established contracts outside of HCI's current scope of work. This offers both companies a strategic incentive to support the partnership. HCI can offer access to our existing customer-base, while the partner company offers access to new market opportunities for HCI.
- Have a reputation for client focus and high quality of service delivery. ISO 9001 certification would be considered an additional asset in this regard, in order to gain synergies with recommendations offered later in this report.
- Ownership structure of the candidate should not conflict with HCI's core service offerings. Eg: The company should not be a subsidiary of (or strongly affiliated with) a primary mechanical contractor.
- While not strictly an operations management issue, it is also critical that the company's labour strategy be compatible with that of HCI. That is, union-affiliation (or non-affiliation) must align with HCI for the locations where services will be offered.
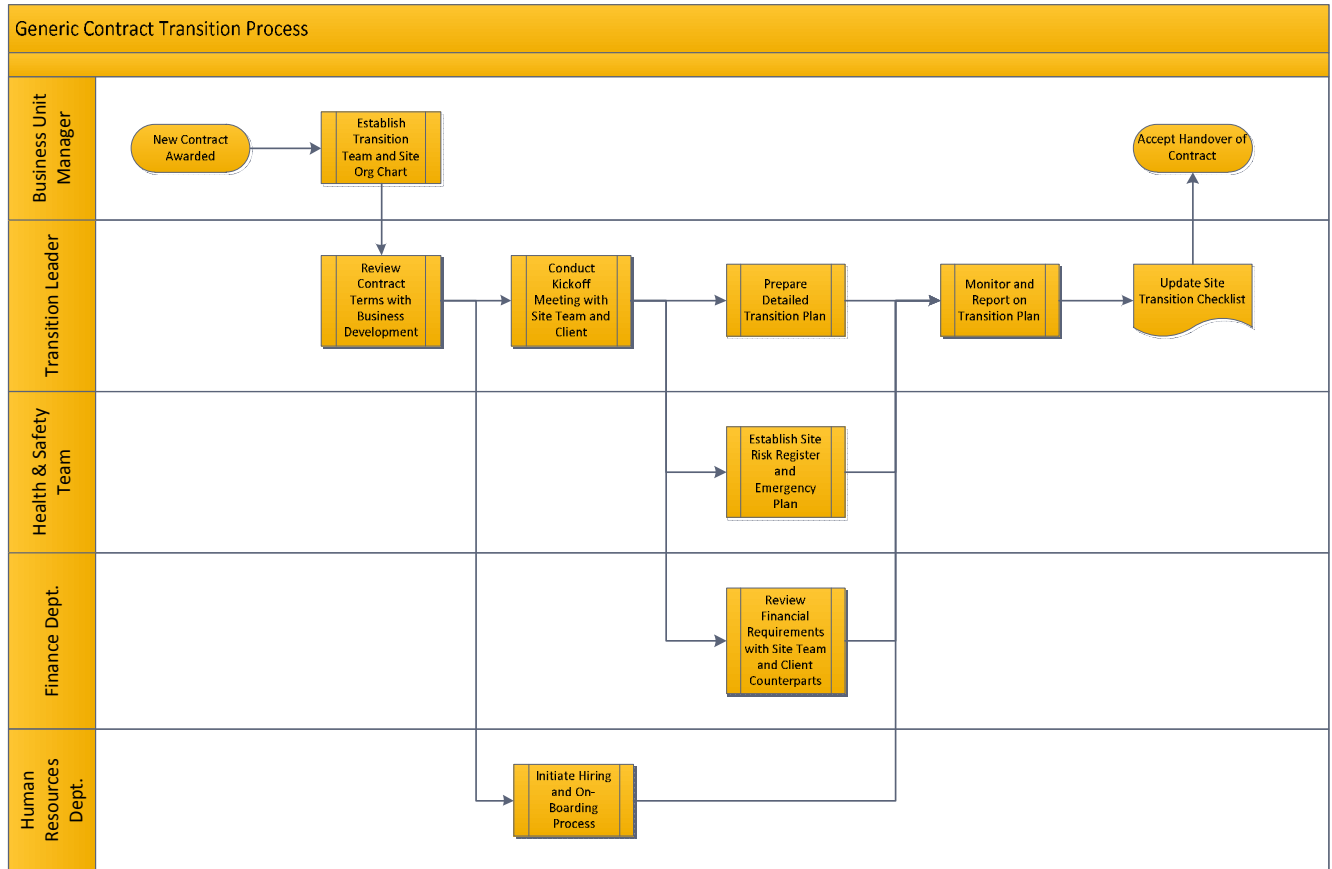
As part of this partnership, HCI should also consider how overhead and management services will be streamlined to ensure maximization of customer value. That is, consolidation of facilities may allow for a reduction in overhead costs for both organizations that can be passed on to the customer (and therefore increase the likelihood of generating additional business). Similarly, leverage of the partner's core competencies may allow the combined organization to provide a greater value to the client through the combining of services.

QUALITY ASSURANCE AND OPERATIONAL EXCELLENCE

In order to address issues of service quality and consistence, we propose to establish a rigorous approach to service design and workflow process design. Owing to the high degree of client contact and interaction, each contract is subject to a high degree of customer-introduced variation. We therefore believe it unlikely that a single workflow process will be possible. Rather, generic workflow processes will be developed for each of the major work streams undertaken by HCI. These generic processes will then serve as the default starting point for each operating site, where additional details will be developed to suit client requirements specific to each Business Unit.

Some examples of these processes and factors to be considered for each are outlined below. Note that only generic workflow diagrams are presented for each process, as it is expected that detailed workflows will be developed as part of a dedicated project following approval of recommendations contained within this report.

1. New Contract Transitions

Generic Contract Transition Process

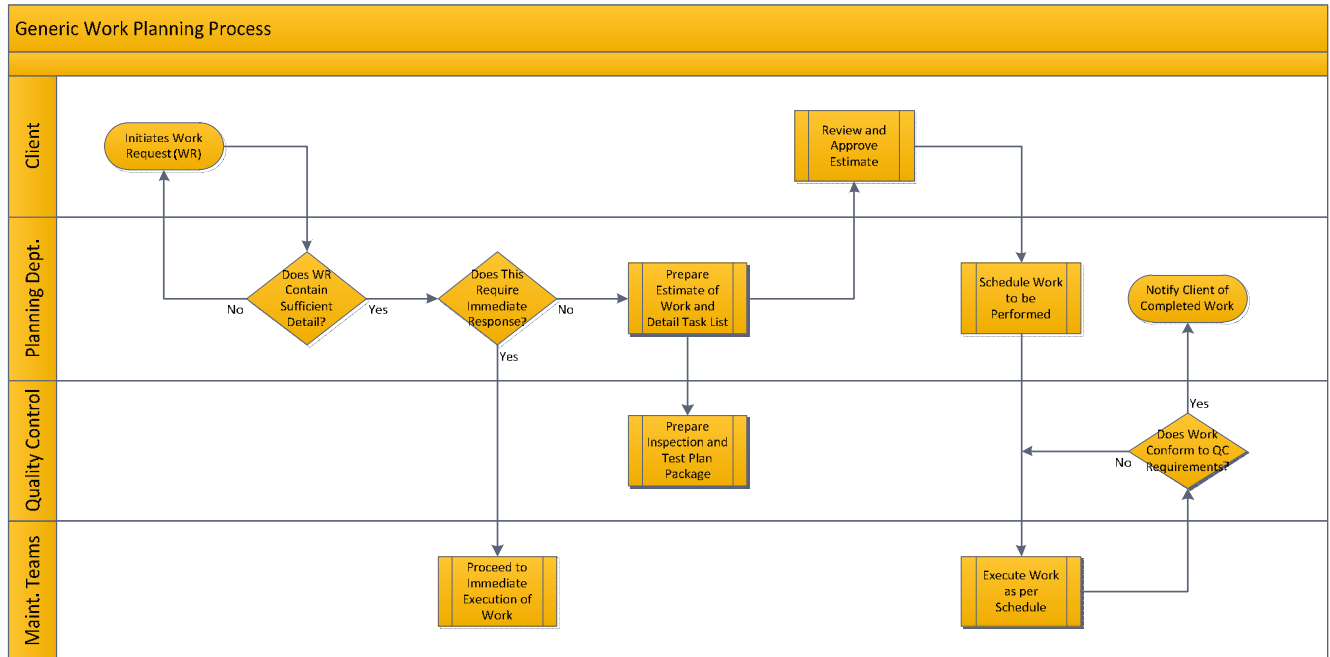| Business Unit Manager | New Contract Awarded → Establish Transition Team and Site Org Chart | | | | | Accept Handover of Contract |
Transition Leader		Review Contract Terms with Business Development → Conduct Kickoff Meeting with Site Team and Client → Prepare Detailed Transition Plan → Monitor and Report on Transition Plan → Update Site Transition Checklist				
Health & Safety Team			Establish Site Risk Register and Emergency Plan			
Finance Dept.			Review Financial Requirements with Site Team and Client Counterparts			
Human Resources Dept.		Initiate Hiring and On-Boarding Process				

In general, award of a new contract will culminate in the formation of a new business unit within the Operations organization. The team comprising this business unit often consists of a significant number of new employees. In order to maximize the success of this team it is critical to ensure that all team members are effectively brought into the organization and provided with the tools and support required to satisfy client requirements.

o Provide dedicated management personnel with HCI experience to support new contracts during transition period in order to kick-start the *learning curve* at the new location. Also consider intra-company transfers for key personnel to seed knowledge of HCI policy and practices into the new contract.

o Establish a clear process for turnover of contract information from Business Development to Operations with a review of contract terms and conditions.

o Develop a standard checklist or project template for common tasks (and accountability therefore) to be undertaken upon award of a new contract.

o Conduct kickoff meeting(s) with key personnel from client, HCI and relevant third parties (sub-contractors and suppliers) in attendance.

o Conduct a formal review of cross-functional requirements with internal and external stakeholders to ensure alignment and clarity of accountabilities. (eg: What information is required from Operations in order to support effective billing to the client?)

o   Establish specific guidelines for development of Health and Safety risk register(s) and Emergency Response Plans at new operational sites.

2. Work Planning

Generic Work Planning Process

Client	Planning Dept.	Quality Control	Maint. Teams

Client: Initiates Work Request (WR) → Review and Approve Estimate

Planning Dept.: Does WR Contain Sufficient Detail? — No → (back to Initiates Work Request); Yes → Does This Require Immediate Response? — No → Prepare Estimate of Work and Detail Task List; Yes → (Proceed to Immediate Execution of Work). Schedule Work to be Performed. Notify Client of Completed Work.

Quality Control: Prepare Inspection and Test Plan Package. Does Work Conform to QC Requirements? — Yes → Notify Client of Completed Work; No → Execute Work as per Schedule.

Maint. Teams: Proceed to Immediate Execution of Work. Execute Work as per Schedule.

HCI's core service offerings in maintenance work execution involve the execution of complex, often high risk work in a heavy industrial environment. As such, detailed planning is normally undertaken to ensure that work can be completed effectively and safely. The contents and format of these work plans, however, can vary widely from one Business Unit to the next, with a resulting variability in field productivity, installed quality and job safety. All of these factors can be improved through the adoption of a standardized work planning process.

Specifically these standards will address the following points:
o   Requirements for work request (problem definition) from the client.
o   Classification and prioritization of requests according to client response time requirements.
o   Materials requisition and ordering processes and requisition forms.
o   Quality Control review and inspection of completed work.
o   Health, Safety and Environmental considerations for work execution.

ISO 9001 CERTIFICATION

We recommend that HCI pursue ISO 9001:2000 certification. The purpose of the ISO 9001 standards is in line with the service design and workflow process design outlined above. The workflow processes detailed above will form the basis for the Quality Management System (QMS) that HCI would implement as the key component in becoming ISO compliant. Strategically, ISO 9001 certification will aid HCI in delivery consistency and quality of service delivery as the organization grows, both in numbers and in geographic spread.

The steps required for HCI to obtain ISO 9001 certification are outlined below:

1. Establish a QMS manual

   The QMS manual will contain the details of the workflow process designs outlined above. Documenting the workflow processes in the QMS manual will act as a "corporate memory" helping HCI to maintain consistent quality even as personnel change in a dynamic work environment. The QMS manual will also act to ensure that consistent processes are used across the diverse geographical regions in which HCI operates. The QMS manual will include provisions to manage incidences where quality defects are detected during project execution.

   Given the nature of HCI's business the QMS will include a focus on the interaction and satisfaction of the client for whom projects are completed by the company.

2. Develop a management commitment statement to the ISO process and to a client focused approach to conducting business

   HCI will incorporate into the company's mission statement and corporate culture a commitment to support the development, implementation, and continuous improvement of the QMS with a focus on ensuring that client requirements are being identified and met.

3. Establish quality objectives

   HCI will establish quality objectives for the company that are in line with the service nature of the business conducted. For HCI the quality objectives will be in terms of meeting or exceeding client expectations with respect to the projects undertaken. The terms will include such aspects of the quality of the physical end product constructed for the client along with meeting budget, timelines, and safety standards.

4. Allocate resources for the establishment of the QMS at the Business Unit

   The corporate structure of HCI in which multiple Business Units are formed on an as needed basis, will require that HCI devote resources within each of the Business Units to implementing the QMS. This will take the form of a QMS manager assigned to each Business Unit. The QMS manager from each Business Unit will form a QMS committee to ensure that QMS improvements are communicated across Business Units.

5. Develop a plan for the implementation of the QMS across the organization

   The implementation plan will indicate the resources (people, money, time) that will be needed to implement the QMS across the different Business Units in existence at the time of implementation, along with plans to allow implementation into new Business Units as they are developed based on project needs.

6. Provide training for workers in the contents of the QMS

   The training of workers in the contents of the QMS will be a challenge for HCI given the temporary nature of large components of the workforce employed by HCI on a job by job basis. As part of the onboarding of new

workers, an orientation to the QMS will be provided, similar to the current OH&S orientation provided to new hires or subcontractors.

7. Provide a suitable work environment for the employees in each of the job sites that allows them to perform to the expectations of the QMS.

    HCI conducts large portions of its business on the sites owned and controlled by their clients. As such, it may be difficult at times to provide a suitable environment for HCI's employees in all cases. HCI will need to communicate to their clients the commitments that they have made to a QMS and have clients work to provide work environments that are conducive to the implementation of the QMS.

8. Establish a monitoring and measurement process to identify the performance of the QMS.

    Arguably the most important step in the QMS process is the establishment of the monitoring and measurement process to identify the performance of the QMS. In addition to the workflow process outlined for new contracts presented above, a similar workflow process can be added to the end of the project cycle. The process will act to close out projects, providing feedback from the client to the HCI to demonstrate that client satisfaction is being obtained on all projects. The monitoring and measurement results will be used to update the QMS on a regular basis defined during the implementation stage.

    At the conclusion of the implementation of the process outlined below, HCI will need to have an independent third party auditor verify compliance of the QMS with the principles and requirements of ISO 9000.

POKA-YOKES

As part of the QMS and processes developed by HCI, a series of Poka-Yokes, or fail safes, should be developed to foster compliance with the QMS. Poka-Yokes take the form of engineering or administrative controls implemented by a business to eliminate mistakes. The nature of HCI's business, in which work is completed at a variety of client work sites, limits the number of engineering controls that can be applied to the work conducted.

The greatest potential for limiting mistakes in HCI's business will come from the use of checklists, forms and templates in managing the projects undertaken for clients. These checklists, forms, and templates will be developed for each stage (or for multiple stages as appropriate) of the workflow process developed by HCI. These will act to both document that the given component of the QMS has been completed and provide reminders to project staff on the requirements that are needed to be completed for a given task. In addition, gate reviews will be built into critical business processes to ensure that internal specialists are engaged for projects of significant size or that are sensitive in nature. (eg: Plant turnaround projects.)

An example of a template that may be used is a spreadsheet for estimating project costs. The spreadsheet will contain common elements of all HCI projects (such as project management, OH&S, taxes etc.) along with flexibility to estimate unique project needs.

DEMAND FORECASTING

Forecasting the demand for maintenance, turnaround and project services gives HCI management the ability to plan for changes in the market. Understanding the demand for services will aid in both longer term strategic forecasting and shorter term tactical forecasting. The demand factors that drive maintenance, turnaround and major project cycles give HCI the ability to adapt or adjust resource levels and activities. Demand forecasting is used for budgeting, cost control, marketing services, promotional activities and for setting marginal labour rates.

Unfortunately, with the trend towards a larger number of short term contracts, HCI can no longer rely upon concrete demand forecasts based upon contracts in-hand. Rather, we must rely upon a combination of factors and sources in order to establish future requirements. In particular, where it appears likely that labour demand will exceed locally available labour, HCI can derive a competitive advantage by securing labour agreements with union locals from further afield within Canada. In truly tight labour markets, HCI can also establish a supply of labour through Temporary Foreign Worker (TFW) programmes in conjunction with Service Canada. As these labour agreements are of finite duration and can require considerable lead time, accuracy demand forecasts are critical.

METHODS

- Seasonal Factors

   HCI clients and prospective customers for turnaround services typically undertake their turnarounds the spring and fall of the year. Analysis of past trends indicates that we can expect an upswing during these periods across all labour trades. We should therefore ensure that we have labour agreements in place to cover the period from March through June and September through October each year for approximately 10% of average craft headcount during the prior 6 months.

HCI - Historical Labour Demand 2007-2011

Total Headcount
6 per. Mov. Avg. (Total Headcount)
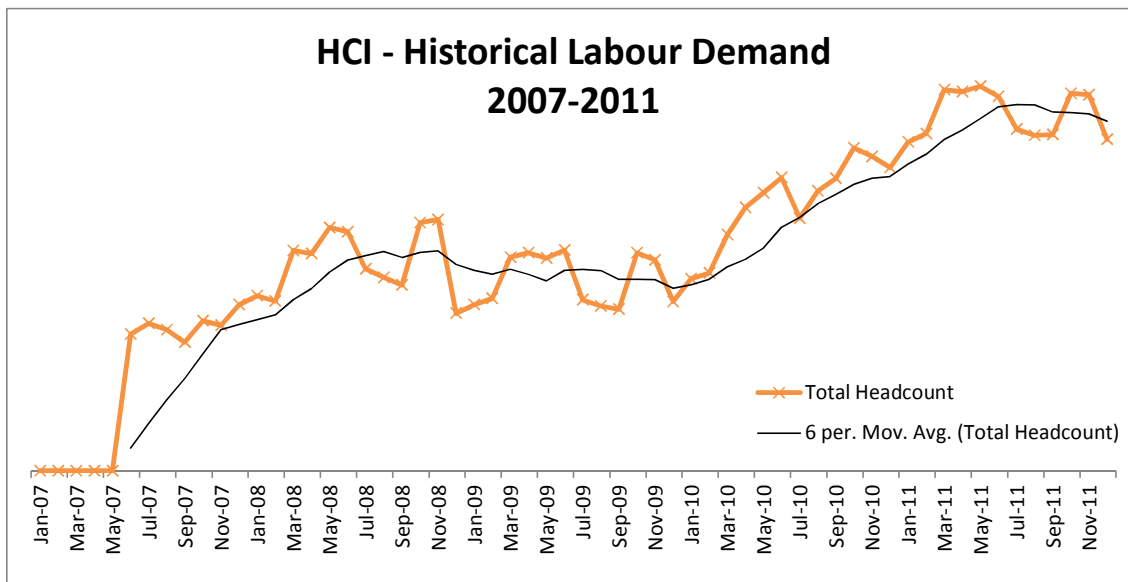
- Delphi Method

  Perhaps the largest unknown with respect to labour demand is in knowing what contracts or projects we will be awarded in any given future period. To improve the accuracy of this extremely important variable, HCI can utilize internal and external experts to predict both short and long term demand for its different revenue streams (maintenance, turnaround and projects). We recommend application of Delphi methodologies for this purpose, based on the known work-in-hand and potential projects in the Business Development "pipeline". Estimates should be further refined to provide "P20", "P50" and "P80" scenarios[6] to provide a likely range of values.

- Government and Industry Forecasts
  - o The largest customers in need of turnaround services utilize a website maintained by the Construction Sector Council. Access to the "alberta.labourmarketlink.com" website will provide HCI with a three year outlook for major project labour requirements. The primary users of the market labour data are the major companies utilizing turnaround services.
  - o Alberta Government maintains an inventory of all major projects. In Dec 2011 the Alberta Treasury Board recorded an inventory of 208.8 Billion dollars in projects (Alberta Treasury Branch, 2011). The Treasury board information included, company name, project value and the schedule. This data can be utilized to predict the demand for project management and construction resources.

    This data, while of moderate interest for short term planning purposes, will prove most useful for intermediate and long-range planning.

By expanding the type and sources of information used in deriving the labour forecasts, we should be better prepared to meet client needs during peak periods.

YIELD MANAGEMENT

From time to time, HCI is approached to provide technical personnel in a Professional Services capacity. While not a core revenue stream for HCI, such activities do present opportunities for additional revenue and can serve as a lead-in for higher volume work in future. Pricing strategy for these services has been set at the same gross margin as is applied to work for sites with high volumes of craft labour.

When compared to companies offering strictly Professional Services, the result is a lower overall charge rate. While this may be desirable in the case of clients where work is likely to lead into larger scope, in many cases this has not come to pass and key resources (the professional staff) are then tied up in low margin, low volume work. Additionally, back office support required to administer the contract and affect billing are disproportionate to the billable time, resulting in a lower overall (net) margin for these services.

We recommend that HCI adopt a Yield Management strategy, whereby work offered strictly on a Professional Services basis is priced at a higher gross margin (in the range of 12% to 15%). We believe that the final sell rate

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[6] P20 = 20% Probability of Occurrence; P50 = 50% Probability of Occurrence; P80 = 80% Probability of Occurrence

will remain highly competitive for those clients seeking such services, while allowing HCI to increase overall revenues and maintain net margins on these services.

CONCLUSIONS

Hypothetical Contractor Inc. has grown quickly in the past 5 years. From initial start up in 2007, HCI has more than tripled revenues to approximately $500M. Despite this success, HCI's growth has plateaued in the past year and the company is at risk of contraction. Expansion beyond the original core market in Fort McMurray requires changes in operations strategy to reinvigorate the organization and ensure a sustainable future.

Based on our assessment of issues facing HCI, we provide the following recommendations:

1. Focus growth on a limited number of regions, supported by a satellite office.
2. Leverage in-house knowledge and available industry data to improve operations demand forecasts.
3. Pursue a strategic partner, who can provide complementary services to supplement HCI's existing core competencies.
4. Rigorously document key business processes, with built in failsafe "Poka-Yokes". Pursue ISO 9001 certification for the company's Quality Management System.
5. Maximize revenue opportunities for Professional Services through adoption of a Yield Management policy.

These initiatives should be considered strategic imperatives[7] for the organization if HCI is to remain competitive and achieve long-term sustainability.

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[7] "Strategic imperatives are those vital few 12 to 18 month goals, priorities, and improvement targets that — when reached — hurl our team or organization toward its vision, values, and purpose." (Clemmer)

WORKS CITED

Alberta Treasury Branch. (2011, December). *Inventory of Major Alberta Projects*. Retrieved 03 19, 2012 from Alberta Government: http://www.albertacanada.com/documents/SP_MajorAlbertaProjects.pdf

Clemmer, J. (n.d.). *Use Strategic Imperatives to Set Improvement Priorities*. Retrieved 03 19, 2012 from ManagerWise: http://www.managerwise.com/article.phtml?id=221

Jacobs, R. F., & Chase, R. B. (2011). *Operations and Supply Chain Management.* New York, NY: McGraw Hill.