A New Economic Narrative for BC

Advancing BC's Manufacturing sector

Township of Langley · Richmond · City of Surrey · BC TECH association

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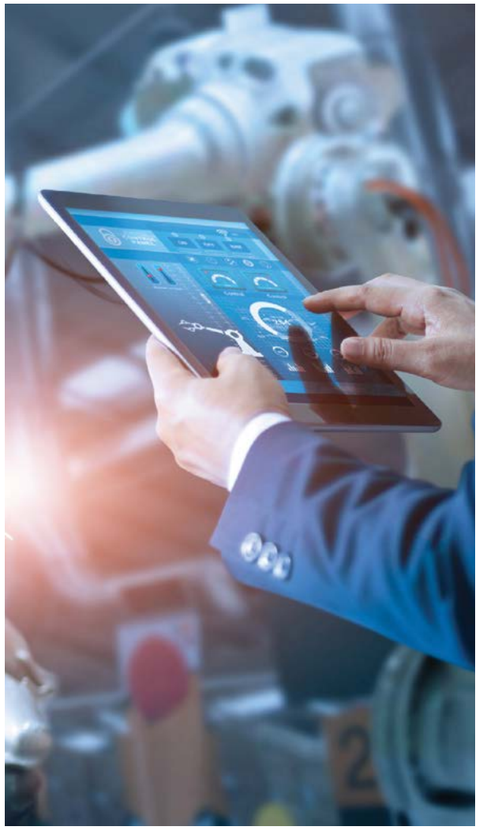
Foreword

BC Tech, in partnership with the City of Surrey, City of Richmond and Township of Langley are proud to be working together towards a new economic narrative for BC, by advancing the capabilities of our manufacturing sector.



As Surrey, Richmond and Langley represent more than 70 percent of all manufacturing activity in BC, our Advanced Manufacturing project has the opportunity to impact thousands of manufacturers and the future of BC's economy.

Over the course of the project, we have identified existing industrial capabilities that could be retooled to support future emergency production needs and helped companies diversify their businesses by focusing on emerging opportunities in new sectors. This De-Risking Emerging Market Opportunities "DEMO" Toolkit and associated Digital Resources will help BC's manufacturers assess market opportunities, adopt technology solutions, build resilience and accelerate their growth.

The digital economy is here to stay, and we want to empower all BC companies to scale by adopting technology. This partnership has enabled us to bring made-in-BC technology solutions to manufacturers to help ensure their businesses continue to grow and thrive.

Jill Tipping
CEO & President | BC Tech

BC TECH association

We gratefully acknowledge the financial support for this project of the Province of British Columbia through the Ministry of Jobs, Economic Recovery and Innovation.

Advancing BC's Manufacturing Sector

Decisions to retool and invest in new product markets are necessary to stay relevant, but they can carry significant risk for manufacturers. This Advanced Manufacturing De-Risking Emerging Market Opportunities (DEMO) toolkit was designed to guide manufacturers through the process of identifying, evaluating, and addressing the risks that come with pursuing an emerging market opportunity.

Taking the leap into a new product market comes with risk, including market risks, transition risks, and operational risks. This toolkit is designed to help identify, evaluate, and respond to risks before they arise. The goal is to help manufacturers explore opportunities and help to inform manufacturers about when to enter a new product market or when to hold back.

The Advanced Manufacturing DEMO toolkit is divided into three sections:

1. Market Risks
2. Transition Risks
3. Operational Risks

The toolkit can be used as a step-by-step guide or as a set of individual exercises. A quick first pass through the toolkit can help identify risk "red flags" and eliminate poor investment decisions. A deeper dive into each section on a second pass is recommended for the most promising opportunities.

De-Risking Emerging Advanced Manufacturing Market Opportunities
TOOLKIT OVERVIEW

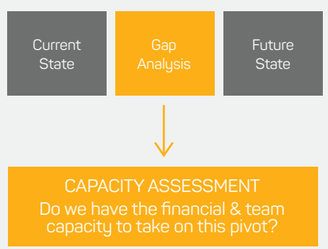
PART ONE
MARKET RISKS

1. How attractive is the market for this product?
2. Do we have any competitive advantages to deliver this product?

PAGES 6-8

PART TWO
TRANSITION RISKS

1. What will it take to retool our current operation to serve this market?
2. Are we in a strong position to take on this transition?



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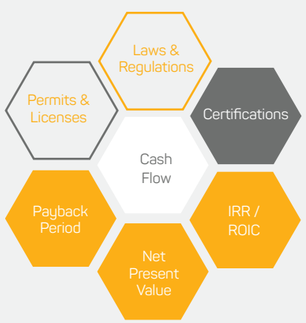
PART THREE
OPERATIONAL RISKS

1. What are the operational hurdles we will need to clear to purse this opportunity?
2. Is this investment likely to result in a strong return?



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PART ONE: Advanced Manufacturing Market Risks

MARKET DEMAND RISK

Identifying and evaluating market risks requires digging into four dimensions of the market:

Market Size: How big is the market?
Market Growth Rate: How quickly is the market growing (or shrinking)?
Market Duration: Is the opportunity likely to be temporary or permanent? Is demand seasonal or stable?
Market Access: What portion of the market are you likely to be able to capture?

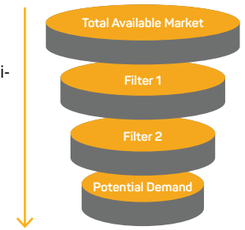
Market Size

Taking a top-down approach to market sizing makes sense when you don't have established sales channels.

The top-down approach involves identifying the full size of the prospective market and subtracting segments that are unlikely to be served by your company.

In practice, top down market sizing looks like this:

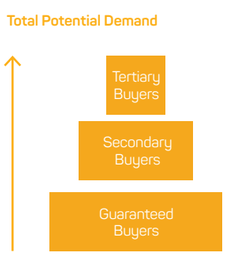
1. Demand for Product (local industry projections)
2. Minus Demand Met by Competitors (with loyal customers)
3. Minus Inaccessible Demand (outside distribution network)
4. Equals Unmet Demand (total accessible market)



Taking a bottom-up approach to market sizing is relevant when you can capitalize on existing retail channels and an existing customer base.

The bottom-up approach involves developing estimates for each individual sales channel and adding them up to estimate the total accessible market.

In practice, bottom-up market sizing looks like this:



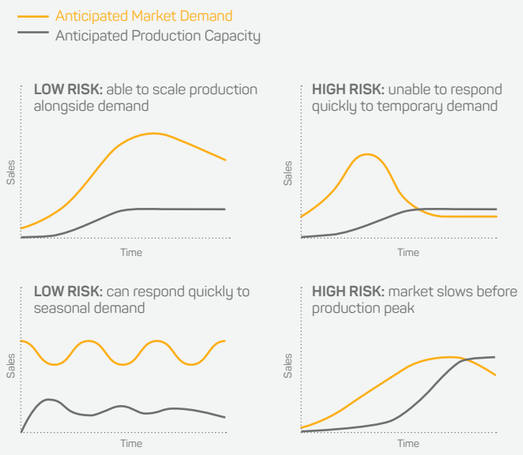
4. Equals Total Potential Demand
3. Plus Anticipated Incremental Sales (e.g. new sales partner)
2. Plus Anticipated Direct-to-Consumer Sales (e.g. online)
1. Anticipated Sales through Existing Retail Partnerships (e.g. purchase orders or handshake agreements)

Market Lifecycle

All markets grow and contract. The following questions can help uncover the market lifecycle of an emerging market opportunity:

1. Initial Demand: How quickly do you anticipate demand to grow? Will the product's value instantly land or is it likely to take time?
2. Growth Cycle: How quickly do you anticipate reaching peak sales? Do you anticipate rapid, gradual, or cyclical growth?
3. Maturity: Once the market is near its peak, how long do you expect it to persist?
4. Decline: At what point do you anticipate the market to decline? Will the decline be slow and gradual or fast and sharp?

Assessing the characteristics of the market's lifecycle against your anticipated production lifecycle can help determine if a new product market is a good fit for your business at this time. Here are some examples of good and bad alignment between market lifecycle and production lifecycle.



EXAMPLE: Plant-Based Proteins Market Demand Assessment

A food processing company, Yum+, is exploring opportunities to develop a line of plant-based protein products. Considerable growth in the market and a strong retail presence contribute to confidence in this market.

A top-down approach to market sizing might look like this:

Total Market Size: Protein Industry Canada assessed the plant-based protein market at $300M last year, and it is anticipated to grow to $1B by 2025.

Filter: Competition: Unmet demand for product variety and limited competition reveals unmet demand of $400M in plant-based protein products if current competitors in this space double their production & sales by 2025.

Filter: Market Share: Based on existing sales channels and brand recognition, Yum+ anticipates it can capture 2% of the unmet demand for plant-based proteins with plant-based salamis, chorizos, and chicken strips.

Total Anticipated Sales (2025)
$1B total sales
- $600M met by current competitors
x 2% market share of remaining market
= $8,000,000 annual sales

A bottom-up approach to market sizing for the same opportunity might look like this:

Existing Retail Partners: Existing grocery partners representing 160 stores currently purchase 3 cases weekly of competing plant-based protein products per store. Each case has 20 units, and many of these retailers have expressed an interest in buying a similar quantity of Yum+ products (the equivalent of 499,200 units of each of the 3 Yum+ plant-based protein products annually).

Online Sales Partnerships: In addition to grocery stores, products will be sold on online grocery platforms in major urban areas. Sales on these platforms are anticipated to reach 800 units per week across Canada.

Total Anticipated Sales (2025)
499,200 units x 3 plant-based protein products
+ 800 units x 52 weeks
= 1,539,200 units sold annually

Assuming each unit is sold for an average of $6.50 in the top-down market sizing example, Yum+ could anticipate annual sales volumes of 1.2M - 1.6M units by 2025.

Market Access Risk

Market Access

Accessing the market will likely rely on existing partners, distribution channels, and customer relationships.

To assess market access, it is important to examine:

1. **Customer Access:** What are the customer segments in the market? Do we have the customer relationships required to be successful?
2. **Distribution / Retail Access:** Do we have access to the required distribution/retail channels for this product? Do we have the right partners?
3. **Competitive Access:** What is the nature of the competitors in the market? Does our value proposition allow us to differentiate ourselves?

The Market Access Canvas on the following page can help identify existing market access strengths and areas where further investments will need to be made.

Market Risk Red Flags

- **Market Size:** The market is not big enough to sustain another player
- **Market Growth:** The market is shrinking or plateauing
- **Market Duration:** The opportunity is short-lived
- **Market Access:** Primarily <u>new</u> partnerships and sales channels are needed to access the market

Market Access Canvas

Fill in the canvas below to help think through existing market access opportunities and new market access needs. Opportunities which allow you to leverage predominantly existing market access channels carry less risk than those that require wholesale changes.

1. Customer Segments

Where are the customers for this new product (geographically)?
Who are the customers for this new product (demographics)?
Where do these customers purchase this type of product?

Existing | **New**

2. Customer Relationships

Which prospective customer segments do we already have relationships with? How loyal are these customers?

Existing | **New**

3. Sales Channels

What existing sales channels can we capitalize on to sell the new product(s)? (e.g. brick and mortar, online, wholesale)

Existing | **New**

4. Key Partners

Who are our key retail, distribution, and supply chain partners?
Which of these partners will be critical to accessing the market?

Existing | **New**

5. Value Proposition

What is our unique value proposition for our products?
Which elements of this value proposition can be carried into the new product opportunities we are considering?

Existing | **New**

6. Competitors

Who are our direct and indirect competitors?
Where is the unmet demand in the market?

Existing | **New**

PART TWO: Advanced Manufacturing Transition Risks

RETOOLING RISK

Identifying and evaluating manufacturing transition risks requires an in-depth analysis of the retooling needs affiliated with producing the new product(s).

Identifying internal changes that must be made to successfully produce, market, and sell a new product is central to the de-risking process. These changes can be identified by outlining current operations, thinking through future needs affiliated with the new product, and pinpointing which needs will be met through changes to existing operations or net new activity.

Transition Impact Analysis

Completing a *transition impact analysis* can help identify the areas of a business that are likely to be most impacted when entering a new product market. The Transition Impact Canvas below can be used to guide this process.

For each of the functional areas of your business, the Transition Impact Canvas prompts you to think through:

1. In what ways will our business activities need to change?
2. How big are the changes, both in terms of financial commitment and team commitment?
3. Who will be most impacted by the changes?
4. How long is each change likely to take?

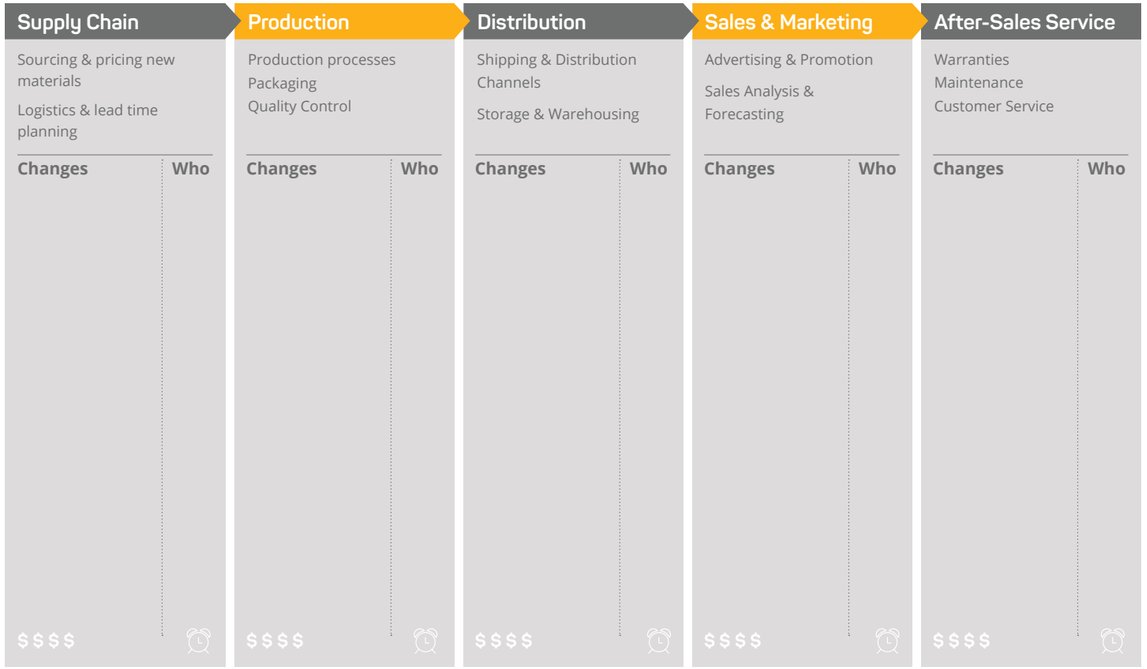
Transition Impact Canvas Directions

STEP 1 Fill in the canvas on the next page to help think through the change to each functional area of your business when entering a new product market.

STEP 2 Once changes are outlined, indicate the relative amount of time each change is anticipated to take by filling in the clock icon.

STEP 3 Circle the appropriate number of dollar signs to indicate the relative cost of each change.

STEP 4 Add the initials of critical staff members or teams next to each anticipated change to get a feel for who will be impacted most by the transition.



PART TWO: Advanced Manufacturing Transition Risks

Capacity Risk

Transition Capacity Assessment

To evaluate manufacturing transition capacity, the following questions must be answered for each of the changes identified in the Transition Impact Canvas:

1. **Is this change possible? Can we find the right partners to support this transition?**

   For instance, if new materials need to be sourced, then suppliers of those materials need to be identified. This may require online research, reaching out to individuals in your professional network, and calling peers and prospective suppliers to find information.

2. **What costs and timelines will be affiliated with each of these changes?**

   For instance, once new material suppliers are identified, material costs and lead times are needed understand the manufacturing costs and time needed to make the change. This type of information can be uncovered through conversations with suppliers and partners.

3. **Do we have the financial capacity to take on this risk?**

   Having estimated the cost of each change, you can now assess whether you have (or have access to) the funding needed to make the change. This means assessing liquidity, as well as access to capital. This will likely require speaking to your bank and/or investors about how much capital you could access and at what cost (interest rate or shares). Government programs (such as business development grants) may also be worth looking into at this stage as an opportunity to reduce financial risk.

4. **Do we have the bandwidth to make these changes, and can we make them quickly enough?**

   Conducting an internal capacity analysis is also critical to effectively evaluating transition risks. This means reflecting on the teams or individuals that will be most impacted by the change and asking:

   - Are we able to allocate employees to meet requirements associated with the transition?
   - If we don't have the internal resources required, are we able to hire new employees or contractors to fill the gap?
   - How supportive is the team likely to be in pursuing this new product opportunity?
   - Does our team have the skills and/or knowledge required to enter this new market?
   - What will we need to do to support our team in making this transition?

EXAMPLE: Plant-Based Proteins Transition Capacity Assessment

Using Yum+ example from Part One of this toolkit, three significant Transition Risks were identified for Yum+ upon filling out the Transition Impact Canvas:

1. New Equipment & Materials Acquisition — costly
2. R&D Processes — costly and time intensive
3. Manufacturing Processes — time intensive to transition staff

Partners: Suppliers need to be identified for new equipment and material inputs into the new products.

Costs: Costs need to be identified for new production equipment, R&D processes, market testing, production design, branding & marketing, packaging design & delivery, and training staff on new processes. In addition, operating & material costs per unit need to be determined to inform product pricing and prospective product margins.

Timelines: Timelines need to be developed to understand how long it will take to get the new products through R&D, market testing, certification, and into production.

Financial & Team Capacity: Based on partner, cost, and timeline research, the executive team needs to determine the total cost and time commitment of pursuing this product line. Internal evaluation of resources will indicate whether or not the company has the resources needed to pursue this market.

Advanced Manufacturing Transition Risk Red Flags

- **Supply Chain:** Supply chains are constrained or suppliers are limited for new materials required
- **People and Culture:** The team is overwhelmed and company culture favours safety over change
- **Credit & Liquidity:** The company has limited cash / credit to invest in this transition
- **Time to Market:** The changes needed to meet this new opportunity will take too long to initiate, reducing our ability to respond to short term demand and capture market share
- **Opportunity Cost:** Pursuing this opportunity will have a significant opportunity cost given limited space & production capacity

PART THREE: Advanced Manufacturing Operational Risks

Compliance Risk

Identifying and evaluating advanced manufacturing operating risks requires ruling out or carefully managing compliance risks.

Regulatory & compliance risk can be a big barrier to entering a new product market, particularly in heavily regulated industries such as food, healthcare, and aerospace. To tackle compliance risk, it is important to become familiar with the various layers of the compliance landscape in Canada.

There are three types of requirements to be aware of:

Laws & Regulations: Laws and government regulations apply to a range of domains where significant changes in operations might trigger regulatory review. These include environmental regulations (if hazardous materials are involved or new facilities are required), land use regulations (if business activities on site are changing significantly), and consumer protection regulations (such as product labelling requirements).

Licenses & Permits: Permits and licenses are typically designed to protect the public, consumers, and systems of trade. For entering a new product market, permits may be needed for building and construction (if new space or facilities are part of the process) or for import /export activities (if substantial new trade relationships are needed).

Certifications: Certifications are used to signal competence or quality and can be either explicitly or implicitly required when entering a new product market. For instance, workers may need additional certifications to use new machinery or work with new materials, products may need to be certified to meet industry quality assurance standards, and, in some cases, facilities may need to be certified to meet health, safety, and quality standards.

The compliance landscape for manufacturers is primarily governed by four entities:

Federal Government is typically responsible for

- Product-related regulations & certifications, including product labelling & measurement accuracy, data privacy, intellectual property protection, environmental standards for products & processes, and national safety standards for products / components
- Trade-related regulations & permits, including international trade, competition, and labour laws

Provincial Government is typically responsible for

- Environmental permits & regulations, including carbon tax and materials handling regulations, such as Extended Producer Responsibility (EPR)
- Workplace Safety regulations, including upholding workplace safety standards, worker training standards, and workplace compensation standards

Municipal Government is typically responsible for

- Land use permits & licenses, including construction & building permits for new facilities and changes to an existing business license

Industry Associations & Certification Boards are typically sector-specific and may be responsible for

- Facility & quality assurance certifications
- Product certifications, such as certified organic
- Professional designations for members of your workforce that need specific qualifications

EXAMPLE: Plant-Based Proteins Proteins & Certifications

Product Certifications

In the short-term, Yum+ plans to use its existing food processing facility to develop and manufacture plant-based protein products. This means the primary compliance risk falls under certifications of the products themselves. Non-GMO, organic, and gluten free certifications may be desired. In addition, all labelling, packaging, and food safety standards set by the federal government will need to be reviewed and met.

Facility Certifications

Based on future growth plans, Yum+ will need a new facility in the next 3 years to facilitate this growth and prepare the company for export to the US. This will require reviewing local zoning policies to find a site, securing a building or renovation permit, and going through the HACCP certification process for the new facility to facilitate exporting to America.

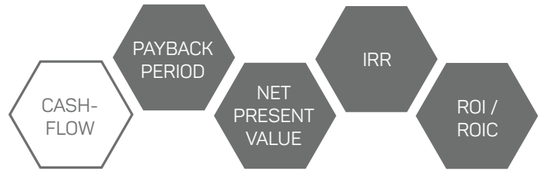
The Canadian Government has launched a website to help identify relevant permits and licenses needed when growing your business.
This resource can be found at www.bizpal.ca

PART THREE: Advanced Manufacturing Operational Risks

Investment Risk

How much financial risk are you willing to bear? This is likely proportional to the size of the reward, measured by a range of profitability metrics.

Cash flow projections are at the heart of each of these metrics, serving as the primary input to most profitability calculations.



In prior sections of the Advanced Manufacturing DEMO Toolkit, you have already developed many of the critical inputs to cash flow projections, including:

- **Market Size (page 6)** The anticipated number of units sold each year or annual demand
- **Market Lifecycle (page 6)** The number of years you are likely to be serving this product market
- **Speed of Transition (page 9)** The number of months required to retool, conduct R&D, and start production to enter this product market
- **Transition Costs (page 9)** The up-front costs, including capital costs, licensing fees, and training expenses affiliated with pursuing the opportunity
- **Cost of Capital (page 9)** The interest rate at which money will need to be borrowed to finance up-front investments in this product market

In addition to these inputs, projecting cash flows requires:

- **Establishing an anticipated unit selling price** based on comparable products or market surveys
- **Calculating the estimated production cost per unit** based on cost of materials, labour, and production
- **Calculating the estimated sales cost per unit** by factoring in the cost of marketing, customer service, and sales activities

The Advanced Manufacturing DEMO Toolkit includes a basic online tool to guide the development of cash flow projections and various profitability calculations. Once assumptions and cash flow projections have been established using this tool, subsequent profitability calculations will automatically update to show the anticipated payback period, net present value, internal rate of return, and return on investment affiliated with entering this product market. The tool can be found online **here.**

Investment Risk Evaluation Tool

There are many ways to evaluate investment risk. Use the online Investment Risk Evaluation Tool to enter your financial assumptions and identify the following:

PAYBACK PERIOD

Payback period is used to calculate the amount of time required to break even. If the anticipated duration of the opportunity (market duration outlined in section 1) is shorter than the payback period, there is an investment risk red flag.

NET PRESENT VALUE (NPV)

Net present value helps answer the question "What is this project worth to us today?" Central to this is the time value of money (the idea that a dollar today is worth more than a dollar tomorrow). Net present value considers the cost of financing and the opportunity cost affiliated with pursuing this product market over investing elsewhere. The greater the project's NPV, the better.

INTERNAL RATE OF RETURN (IRR)

Some companies have a clear mandate on the return required to pursue an opportunity. This is referred to as the hurdle rate for a project. If the internal rate of return (IRR) doesn't meet your specified project hurdle rate, then the project is not sufficiently profitable to meet the company's investment standards.

RETURN ON INVESTMENT (ROI)

Return on investment is valuable for understanding the comparative value between multiple investment opportunities. The product market with the highest ROI or ROIC (return on invested capital) is comparatively more profitable than the other.

Advanced Manufacturing Operational Risk Red Flags

- **Laws & Regulations:** Complex legal environment; lack of clarity on regulations
- **Permits & Certifications:** Unclear timelines for securing permits & certifications
- **Low Profit Margins:** Limited profitability buffer if projected R&D costs / timelines are not met
- **Opportunity Cost:** Pursuing this product option is less profitable than other investment options

Advanced Manufacturing DEMO Toolkit Conclusion

Managing Risk

Once the risks affiliated with entering an emerging product market have been identified and evaluated, there are several response options.

1. AVOID the risk through strategic decision-making
2. MITIGATE the risk by limiting exposure
3. TRANSFER the risk to third parties

Identified Risks

Advanced Manufacturing Market Risk Red Flags

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Response Options

Advanced Manufacturing Market Risk Response Options

AVOID entering a market that is declining or already crowded with competitors

MITIGATE market risk by transitioning a small part of your operation and testing the market with small product runs

TRANSFER market risk by securing purchase orders and other customer confirmations prior to production

Advanced Manufacturing Transition Risk Response Options

AVOID decisions that save a small amount of money but open you up to significant risk. For instance, if a supplier is less expensive but unreliable, consider opting for a more expensive but reliable option

MITIGATE risks through thorough research into each change your business will need to make. This could include identifying and securing quotes from suppliers, working with your accountant to understand financial exposure, and engaging your team in the decision to limit negative impacts on people and bandwidth

TRANSFER risk where possible such as through 3rd-party employee training programs, insurance, and leasing rather than purchasing equipment

Advanced Manufacturing Operational Risk Response Options

AVOID compliance risk by minimizing the activities that will trigger the need for additional licensing, permitting, and certification

MITIGATE risk of sunk costs by placing a limit on how much time and money you can sink into R&D activities before deciding to move on to a new opportunity

TRANSFER investment risk by exploring opportunities for R&D grants or partnerships

For more information on Advanced Manufacturing strategy de-risking emerging market opportunities and the complete set of Advanced Manufacturing DEMO toolkit online tools, reach out to your local economic development office or visit:
https://wearebctech.com/new-economic-narrative-advancing-bcs-manufacturing-sector

We gratefully acknowledge the financial support of the Province of British Columbia through the Ministry of Jobs, Economic Recovery and Innovation.