

# **Titomic Limited**

(ASX: TTT)

# **Digital Manufacturing Solutions**

Investor Update
June 2019

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### **ASX Announced Project Status**













Previously announced projects have all been initiated with some now moving into next phase of production trials after successful results from Phase 1 testing. Significant revenue opportunities exist for 2019 from both the TAUV soldier systems project and the Boeing aerospace parts involving immediate OEM production from the Titomic Melbourne Bureau. Ongoing projects with Trek, Callaway and Fincantieri are progressing well after successful completion of phase 1 projects which are now proceeding to phase 2 production trials with potential revenue expected during 2020. Callidus is currently evaluating a phase 2 project for large size pipe and flanges with revenue opportunities expected in 2020.

Project	Industry	Current Status	Completion	Next Phase
TAUV	TKF AM of high-end defence parts	Phase 1 & 2 complete, signing contract for Phase 3 OEM Production	Dec 2019	TKF Bureau OEM production & TKF system sale
Boeing	Aerospace	Phase 1 & Phase 2 production trials	Oct 2019	TKF Bureau OEM production of parts
Callidus	Mining, Oil & Gas	Scoping project to sign contract for Phase 2 Production trials	Dec 2019	TKF Bureau OEM production & TKF system sale
Trek	Titanium bike frames	Phase 1 complete, contract signed for Phase 2 Production trials	Dec 2019	TKF Bureau OEM production & TKF system sale
Callaway	Titanium & Super alloy golf clubs	Phase 1 complete, now signing contract for Phase 2 Production trials	Oct 2019	TKF Bureau OEM production & TKF system sale
Fincantieri	Turbine parts & anti-fouling coatings	Phase 1 complete, now signing contract for Phase 2 Production trials	Dec 2019	TKF Bureau OEM production & TKF system sale
RMIT, CSIRO, IMCRC	Titanium Aerospace TKF AM parts testing	6 months into project on schedule & budget	Dec 2020	\$2.6M 2 year project
Swinburne, ANSTO	TKF machine design & Material Science	Engaged 3 x PhD Research projects	July 2022	3 year project & TKF system sale

### **Current Projects - Aerospace**











The Aerospace industry continues to engage Titomic for future capability around Titanium Aerospace structural parts made with Titomic Kinetic Fusion (TKF) due to the considerable benefits TKF has over other 3D metal Printing limitations of build size and speed. It must be understood that production of Titanium Aerospace structural parts requires considerable validation and testing before being approved for use however, the combination of the various R&D projects with research organisations, combined with major primes as industry partners, means Titomic is likely to receive initial revenue 2020 forecast to be USD\$3 - \$5M coming from these industry partners.

Revenue opportunities of USD\$100M+ p.a. for the OEM production of Aerospace near-net structural parts is estimated to start within 2 - 5 years after successful regulatory approvals and validation. Tooling projects currently underway for various Aerospace clients is being fast-track due to their up to 17 year backlog on the supply of tooling to complete the anticipated future commercial aeroplane production needs with the USA tooling market estimated increase to USD\$24B. Titomic's client tooling trials are expected to show a significantly reduced lead time from 6mths to 6weeks for a large scale tools for moulding carbon fibre aerospace parts.

Titomic sees the OEM production of tooling as a significant revenue opportunity given the Industry's immediate need for faster production times. As the Tools are only metal moulds easily manufactured with TKF they require much less validation. Should the trails be successful, the potential revenue opportunities for 2019 are estimated to be USD\$1 - \$3M, increasing to USD\$10 - \$20M in 2020. We are exploring other projects for Titanium alloy coatings on CFRP composites that are forecast to bring in early revenue in 2020 from phase 1 & 2 projects with considerable longer-term revenues estimated to start within 2-5 years after successful regulatory approvals and validation.

Clients Requiring Tools	Project	Schedule	Opportunity	
USA Aerospace Prime	Mould tooling TKF systems for composite cabin parts	Commenced Phase 1 Project contract	TKF Bureau OEM production of parts	
Australian division of major USA Aerospace Prime	Titanium alloy coatings on CFRP composites	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts	
European Aerospace Prime	Titanium airframe structural parts	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts	
European Aerospace Tier 1	Titanium alloy coatings on CFRP composites	Phase 1 complete & signing contact Phase 2 production trials	TKF Bureau OEM production & JV TKF License	
USA Aerospace Prime	Invar mould tooling systems for CFRP structural parts	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts	



### **Current Projects - Defence**













Defence Industry continues to engage Titomic for both immediate and future capability around Titanium and other super alloy lightweight parts and coatings made with Titomic Kinetic Fusion. Titomic is working closely with global defence primes to de-risk their R&D projects whilst validating TKF Additive Manufacturing as commercially viable for OEM production of various parts and coatings with.

Significant revenue opportunities exist in the fastest growing sector of Defence industry globally for Soldier systems products, the production of which require less validation processes. The revenue opportunities for Titomic from the Defence Industry is forecast to be AUD\$1.5M for 2019 with this increasing to USD\$5 - \$8M in 2020.

Titomic has been invited to explore some significant classified defence projects we are expecting to finalise negotiations on in 2019 with large revenue opportunities estimated to be in excess of USD\$10M for 2020 and moving beyond. The TAUV project has shown the considerable advantages of TKF OEM production to be cost competitive against traditional manufacturing methods as well as superior performance of the products with new unique performance capabilities.

Titomic is working collaboratively with TAUV to fast track OEM production of some soldier systems products that are currently being tested that could see potential revenue of up to AUD\$1.5M on top of the phase 3 AUD\$1.5M. We have received strong interest from several defence primes to purchase TKF1000 systems for their own research on next generation metal super alloys and various high performance coatings for ballistic protection. Titomic believes it will finalise the sale of at least 1 TKF 1000 in 2019 for USD\$1.5M with the sale of another 2 TKF1000 machines currently being negotiated for finalisation in early CY 2020.

Client	Project	Schedule	Opportunity
Australian Marine Company	Titanium high-speed 8-12m boats	Phase 1 complete, moving to contract for Phase 2 production trials	TKF Bureau OEM production
Australian Solider Systems Tier 1	TKF AM of high-end defence parts	Phase 1 & 2 complete, moving toward contract for Phase 3 OEM	TKF Bureau OEM production & JV TKF License
European Defence Prime Classified		Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts
European Naval Defence Prime	Classified	Scoping OEM supply MOU	TKF Bureau OEM production & TKF License
European Naval Defence Prime Turbine parts & anti-fouling coatings		Phase 1 complete, now signing contract for Phase 2 Production trials	TKF Bureau OEM production & JV TKF License
Singaporean Defence Prime Classified		Scoping OEM supply MOU	TKF Bureau OEM production of parts



## **Current Projects - Defence**

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Client	Project	Schedule	Opportunity	
Spanish Defence Prime	Classified	Phase 1 & 2 completed.	Verified TKF process	
USA - Defence Tier 1	Titomic USA Sales & Distribution	Scoping initial MOU	Titomic USA Sales & Distribution	
USA - Defence Tier 1	Classified	Scoping initial MOU	TKF Bureau OEM production & JV TKF License	
USA Defence & Aerospace Prime	Space flight hypersonic coatings	Scoping TKF capability & defining projects	TKF Bureau OEM production of parts	
USA Defence & Aerospace Prime	High-performance ballistics coatings	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts	
USA Defence & Aerospace Prime	Titanium & super alloy structural parts	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts	
USA Defence & Aerospace Prime	Various Defence projects	Scoping OEM supply MOU	TKF Bureau OEM production & JV TKF License	
USA Defence & Aerospace Prime	Classified	Scoping initial MOU	TKF Bureau OEM production & JV TKF License	
USA Defence & Aerospace Prime	Heterogeneous coatings	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts	
USA Defence & Aerospace Prime	TKF AM of aerospace manufacturing system parts	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts	

### **Current Projects - Mining**











Titomic is continuing to gain the interest of the Mining industry sector for its various applicable applications with the nearest term revenue opportunities existing for the coating of existing mining assets to improve their wear protection and strength.

Opportunities also existing for the repair of worn or damaged parts to reduce the significant downtime and maintenance costs of the large mining organisations. Being able to just-in-time repair or manufacture spare parts using the Titomic Kinetic Fusion (TKF) process will reduce the need for mining organisation to carry a large number of spare parts for their critical mining infrastructure thus reducing their level of available cashflow they have tied up in carrying a larger amount of inventory.

Titomic is working with a number of Mining companies regarding the use of the TKF production process to produce improved wear-resistant coated parts and repair of critical infrastructure which can either be produced by Titomic through an OEM production arrangement, or performed in-the-field by the customer directly with their own TKF system.

Client	Project	Schedule	Opportunity
European Titanium manufacturing company	Titanium product manufacturing	Evaluation Phase 1 Project	TKF Bureau OEM production & JV TKF License
Major Australian iron-ore producer	Wear resistant coatings & repairs	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production
Mining Equipment & Repair Prime	Wear resistant coatings & repairs	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production
Australian Resource Engineering company	Wear resistant coatings & repairs	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production



### Current Projects – Consumer Goods 🛹 🕺 🔭













Titomic has progressed a number of Consumer Goods opportunities to the next level include previously announced projects we're undertaking with Trek Cycles and Callaway Golf. The recently commenced Phase 2 of the Trek project will see Titomic deliver up to 18 different frames to Trek by the end of 2019 for extensive validation and testing to be undertaken over a proceeding 6-12 month period. The initial samples under the Callaway trial project have been delivered for initial testing with sample club to be produced by end of Sept 2019 for validation.

Titomic will have a large presence at EuroBike in Sept 2019 where it will be showcasing a new range of Titomic produced frames as well as announcing a new international partnership with a well known boutique bicycle company to produce high-end custom made frames. Further projects with other car-rim, bike, e-bike, wheelchair and luggage organisation are all progressing.

Client	Project Schedule		Opportunity
Australian Bike Association	Special Projects - Team race designs	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production
Australian University	an University Australian Team Track Racing Bikes Evaluation Phase 1 Project & Signing Contract		TKF Bureau OEM production
European bike company	Titanium Bike Gear Sprocket	Phase 1 Project Underway	TKF Bureau OEM production of parts
European bike company	Titanium Wheel Hub	Phase 1 complete, now signing contract for Phase 2 Production trials	TKF Bureau OEM production of parts
European bike company	Titanium alloy & CFRP composite bikes	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production
European Luxury luggage OEM	Titanium luggage	Phase 1 complete, now signing contract for Phase 2 Production trials	TKF Bureau OEM production of parts
USA bike prime	Titanium bike frames	Phase 1 complete, now signing contract for Phase 2 Production trials	TKF Bureau OEM production & JV TKF License
USA golf prime	Titanium & Super alloy golf clubs	Phase 1 complete, now signing contract for Phase 2 Production trials	TKF Bureau OEM production & JV TKF License
USA Wheelchair company	Lightweight Titanium Frame	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production of parts



### **Current Projects – Government**













Titomic has been approached by a number of government departments both locally and overseas to establish new programs to build TKF Melbourne-style bureaus to bring TKF production capabilities to their local regions to service their market and explore applying the additive manufacturing production capabilities to traditional industries.

These bureaus will also draw on Titomic's established powder supply chain relationships to fulfil production, whilst also containing on-site powder production facilities to explore new material and alloy capabilities.

We're particularly excited to be working on a significant initiative with the Victoria Government which, with their assistance, will see Titomic establish a major powder production and material science testing capability to develop new Australian sovereign capabilities utilising Australian mineral sands reserves rich in ilmenite (29% of the world's stores) & rutile (44%) to create new feedstock powders.

Client	Project	Schedule	Opportunity
USA DoD & Defence Prime	Top Secret	Evaluation Phase	TKF Bureau & Powder Production Facility
Japan Government	Japan Government TKF Bureau & Powder Production Facility		TKF Bureau & Powder Production Facility
Singapore Government	TKF Bureau & Powder Production Facility	Scoping completed. Contract negotiation	TKF Bureau & Powder Production Facility
Victorian Government  Advanced Technology Centre  TKF Bureau & Powder Production Facility		Capability evaluation & negotiation	TKF Bureau & Powder Production Facility

### Current Projects – Transport & Other 🧈 🕺 🔭













Titomic is in Phase 1 trial for Titanium automotive wheels for luxury cars, this is an exciting project as currently there is no manufacturer due to the traditional process of manufacturing Titanium wheels being too expensive and timely. The TKF trials have shown some considerable advantages of Carbon Fibre wheels as there is no heat effect from braking and they are the same weight and strength. TKF Titanium wheels production can be fully automated with high revenue opportunities that can be realised in 2020 once testing and regulatory compliance is carried out.

Titomic is currently working on scoping two very significant projects for high performance luxury cars as well as a Formula 1 racing team that if successful will further validate the commercial reality of Titomic Kinetic Fusion as a viable additive manufacturing process high performance products. The Titomic sales team is currently working with one of the largest global building companies scoping the TKF capability for producing large infrastructure projects in remote locations that would see phase 1 and 2 trials commencing in 2020 with significant revenue opportunities. There is also a general engineering project for reducing the machining time of plastic extrusion screws that are currently machined from a solid rod by a large European manufacturer. This project would see a phase 1 trial on successful completion move directly into OEM manufacturing from the TKF Melbourne bureau.

Client	Project	Schedule	Opportunity	
Australian automotive wheel company Titanium wheels		Phase 1 Trials started then move to Phase 2 Production trials	TKF Bureau OEM production	
European luxury sports car manufacturer	Titanium fuel tanks, exhausts & wheels	Phase 1 Trials started then move to Phase 2 Production trials	TKF Bureau OEM production	
USA Building Prime	Industrial Scale Pipe & Fittings	Evaluation Phase 1 Project & Signing Contract	JV TKF License & TKF Machine Sales	
Plastic Extrusion Equipment Prime	Plastic extrusion screws	Evaluation Phase 1 Project & Signing Contract	TKF Bureau OEM production	
F1 Race Team	Production of Driver Safety Cage	Evaluation Phase 1 & 2 Project & Signing Contract	TKF Bureau OEM production	



# TITOMIC III

TKF Melbourne Bureau

TKF 9000 System

### Melbourne TKF Bureau Update

TKF Melbourne Bureau is a digital manufacturing solutions centre for metal additive manufacturing. Titomic leads the way in digital manufacturing for various industries with our unique capabilities that are cost competitive with traditional manufacturing. Titomic Kinetic Fusion Bureau is the first of many to be rolled out globally to provide our customers with global leading manufacturing solutions.

### Multiple new developments in 2019 for Titomic's TKF Bureau are:

- TKF 1000 System Installed, commissioned & operational
- TKF Robotic Polishing System Installed commissioning scheduled for October 2019
- New spray head for TKF production line delivered & commissioning August 2019
- ISO 9001 Accreditation & Implementation of security protocols for Defence work
- CNC Machines & workshop Installed, commissioned & operational
- TKF Digital platform hardware & software for Industry 4.0 smart factory capability



TKF 1000 System



TKF Robotic Polishing System



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TKF 1000 System



TKF 9000 System

### **Titomic Value Proposition**

Titomic Kinetic Fusion (TKF) provides a commercially viable digital manufacturing solution to overcome the technical and economic constraints in additive manufacturing to revolutionise the metal manufacturing industries to enable smart factories and future sustainability of resources. The Titomic value proposition, to industry, is to realise commercial viable digital manufacturing solutions that provide competitive advantages to our customers. The unique capabilities of TKF provides additive manufacturing solutions that are cost effective with improved efficiencies and performance.

### Titomic Kinetic Fusion is a key enabler of digital manufacturing solutions

**Transforms production value proposition:** TKF can output complex metal shapes from CAD with no cutting, bending or welding needed eliminating the time and costs associated with traditional metal fabrication

**Lowers total costs to enable onsite production:** As end-to-end production can be completed onsite, this lowers labour cost, overheads and transport footprint, to make production cost competitive to global outsourcing

**Speed of production:** Ability to create parts of any size and complexity in a hours not days.

**Substantially less material waste:** Milling titanium to produce parts can have up to 90% waste. TKF uses only the material that is needed.

**Versatile:** TKF can run production using Titanium, other metals, alloys, superalloys and composites

### New Global Demand for Titanium Products in US \$4T Metal Industries

• Current global additive manufacturing (AM) market is USD\$10B pa with metal AM approx. USD\$3B pa of this total. The global demand for Titanium products manufactured more efficiently with metal AM is growing exponentially beyond aerospace and defence applications into other areas of the USD\$4T pa metal industries such as marine and automotive as new Titanium applications are unlocked by Titomic

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	Defence	Aerospace	Marine	Resources	Auto	Sports	Construction
Need for large seamless monocoque structures	✓	✓	✓	✓	✓	✓	✓
Products with the highest strength to weight ratio	✓	✓	✓	✓	✓	✓	✓
Parts and coatings with high heat resistance and thermal conductivity	✓	<b>√</b>		✓	<b>√</b>		✓
Parts and coatings with corrosion resistance for aggressive environments	✓	<b>√</b>	✓	✓	✓		✓
Parts and coatings for hypersonic, ballistic and erosion protection	✓	✓	✓	✓	✓		✓
Near term market potential (Per Annum in USD\$)	DoD Projects \$760B & Soldier Systems US\$9B	Special coatings \$9B & Tool moulds US\$24B	Special coatings \$50B & Titanium Boat Hulls \$30B	Pipelines 264B & Valves & Pumps \$88B	Titanium Car Rims \$40B & Metal Parts \$84B	Sporting Goods \$33B & Bicycles plus Parts \$52B	Cladding & Architectural features \$230B



### **Titomic Global Intellectual Property Position**

Patent portfolio covers TKF and incorporates new IP exclusively licensed from CSIRO

	Titomic Kinetic Fusion process Load bearing structures	Pipe Manufacturing & Continuous Pipe Processes
IP Description	Application of cold-gas dynamic spraying of titanium or titanium alloy particles onto a scaffold to produce a load-bearing structure	<ul> <li>Process to producing valves, flanges and pipe using Cold Spray; and</li> <li>Process to producing seamless continuous titanium pipe using Titomic Kinetic Fusion™ (TKF)</li> </ul>
Licence Terms	Exclusive licence from CSIRO	Exclusive licence from CSIRO
Granted	Australia, New Zealand, Europe, China, US and Japan	Europe, Ukraine, Australia, US
Pending	Korea and Hong Kong	-

### **Revenues Satisfying A High-Growth Market**

Multiple revenue streams leading to strong reoccurring revenues



**Advisory & Prototype** 

**Engineering Design Advisory & Prototype Services** 



**Technical Lab** 



**OEM Production of Customer Products at Titomic Bureaus** 



**Titomic Bureau Expansion** 



**TKF System Sales** 

**Sales of TKF Systems + Digital Manufacturing Platforms** 



**Strategic Acquisitions** 



**Metal Powder Sales** 

**Supply of Metal, Titanium & Super Alloy Powders** 



Gas Atomiser Program

TITUMIC

### **Revenue Channels and Growth from Strategic Investment Partnerships**

Multiple strategic projects to grow Titomic's global standing and capability for multiple revenue channels



Global Technical Collaborations
(OTC, GE, CSIRO, RMIT, Swinburne, ANSTO)
World First Laboratory (Zeiss)

--- 6 Months ---





**Titomic Bureau Expansion** 

Victoria, (AUS), Europe (Germany), USA (Seattle), Asia (Japan)

--- 9 Months per site ---





ROBOTICS





Nederman

**Strategic Partnerships** 

**Secure Supply Chain, Key Sales Channels, Lower COGS** 

--- Expansion 6 months ---





**Gas Atomiser Program** 

**Cheaper Feedstock and Development of New Metal Powders** 

--- Production Ready in 18 months ---





TITOMIC

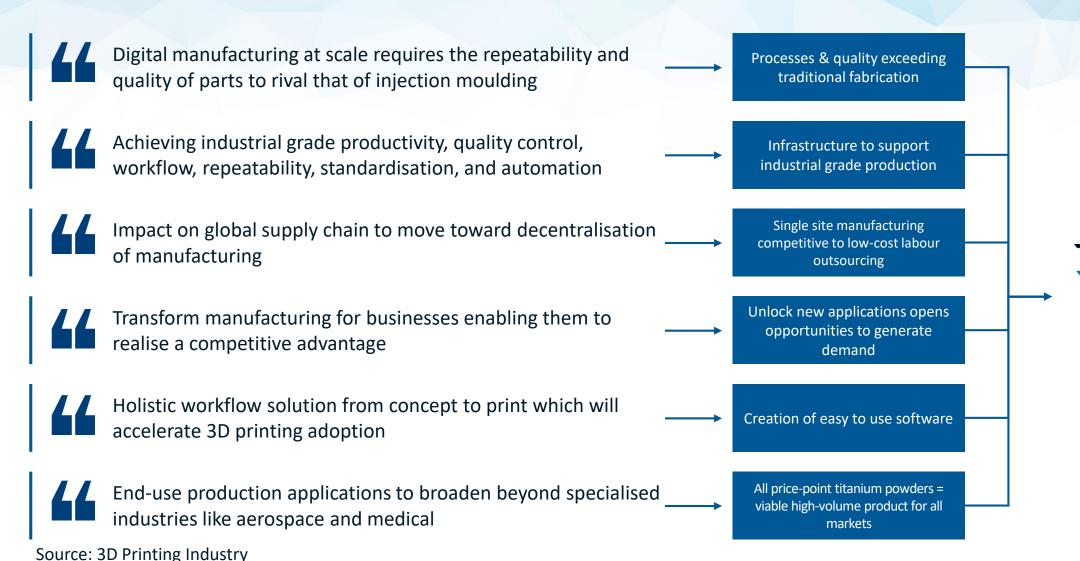


# Appendices



### Titomic Ahead of AM Manufacturing Trends

Titomic is acting on the main trends identified by industry peers



TITOMIC

### **Company Snapshot**



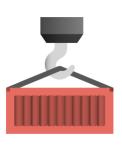
Meeting global demand: Scale to meet significant global demand for Titanium products from industries



Business model: Bureau OEM production and R&D services, TKF system sales and metal powder sales



Value proposition: The only viable AM process to manufacture with Titanium effectively and economically



Investment to date: \$20m into commercialisation of TKF, systems, supply chain & standards development



Global IP: Patents licensed exclusively from CSIRO for Titomic Kinetic Fusion™ for Titanium structures, pipes and valves.



Diverse revenue streams: Multiple transaction and recurring revenue streams with high margin potential



### Strategic Growth Plan

• Titomic's strategic journey is focused on four key factors which will deliver the future growth.



Solid Foundation: \$20m invested into TKF, supply chain, infrastructure & commercial development



### Maximise Growth Demand

- ✓ Promote production run & machine sale model
- ✓ Develop direct sales presence
- ✓ Service existing distributors (eg Sino-Euro)



### QA & Standards to Open New Markets

- ✓ Certified ISO9001:2015

  Quality Management System unlocks procurement from global enterprises
- ✓ Open Aerospace & Defence industries (FAA, DoD & NASA) with MMPDS standards



### Strategic Acquisition & Investment

Targeting acquisitions and investment that:

- ✓ De-Risk the supply chain
- ✓ Provide access to new product verticals
- ✓ Provide new technology
- ✓ Access blue chip client base & revenues



## Build Global Capacity & Supply Capability

- ✓ Commissioning of Bureau (housing the world's largest & fastest 3D printer) in US, Europe & Japan
- ✓ Build Titanium Powder Plant in Australia, US & Europe
- ✓ Create materials validation lab in Australia



### Revenues Satisfying Customer Demand

Differentiated business model reduces barriers to adoption while increasing long tail of revenues

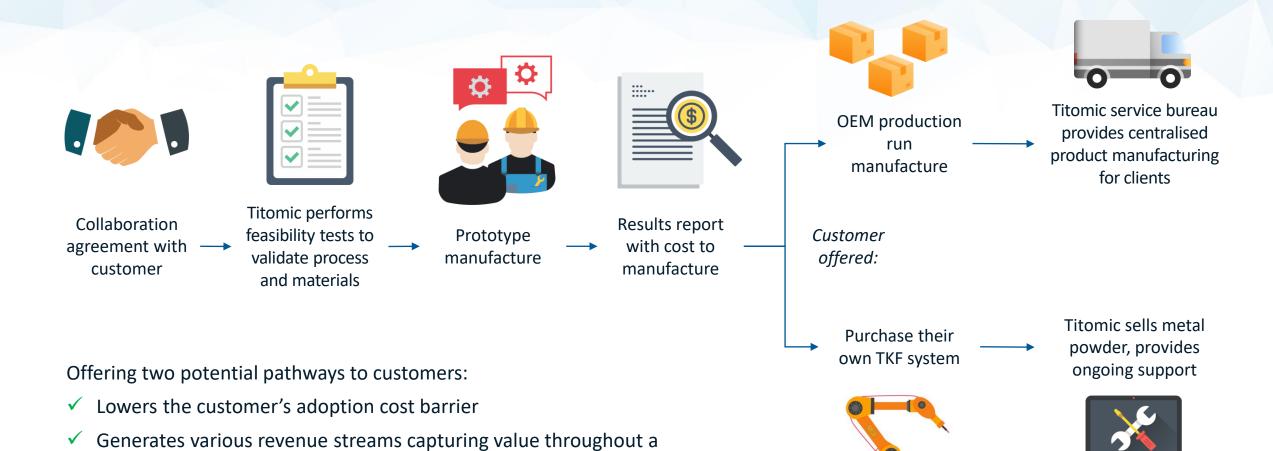


@ Customer site

### **Customer Journey with Titomic**

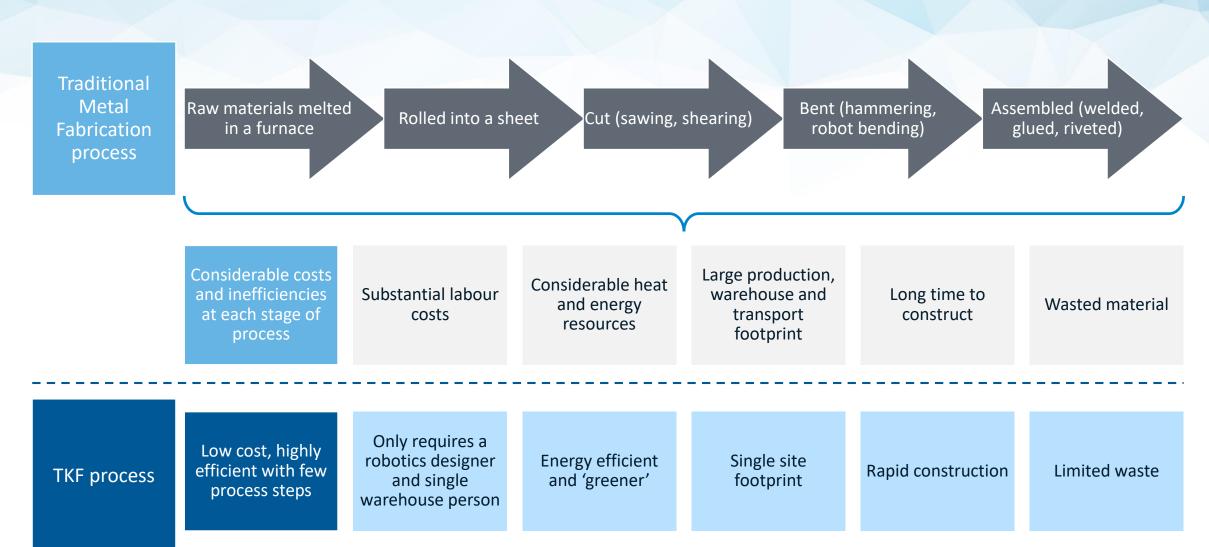
customer lifecycle

De-risks the business model by providing optionality



### Traditional Metal Fabrication vs TKF

• TKF disrupts the inefficient, resource-heavy traditional metal fabrication process unchanged for thousands of years





### **Digital Manufacturing Solutions**

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