

Blockchain in the Seafood Processing Industry

Consulting Fundamentals_MGMT90148



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Executive Summary

This report is produced by Impact Consulting for the Australian Institute of Food Science and Technology (AIFST) on the Australian Domestic Seafood Processing Industry. We have critically analysed the potential impact of implementing blockchain on the industry and provided recommendations for major players within the industry.

Methodology

The report is composed of four steps. In the first step, the objectives and the scope of the project are defined. The second step introduces the background and provides a situational analysis for Australian domestic seafood processing industry. Then, key potential impacts of blockchain adoption are generated from descriptive issue tree analysis, based on a 'product, people, environment' model. After that, a prescriptive issue tree analysis using both Mckinsey's 7-Step and 4P's models is adopted to generate recommendations for major players within the industry. In the last step, summary of the report is presented.

Key Findings

1. Blockchain can enhance transparency by increasing operational efficiency of the supply chain.
2. Blockchain increases traceability of products within the complex supply chains.
3. Blockchain can increase the accountability of all parties.
4. Consumers will have more knowledge and control over making informed purchase decisions.
5. Blockchain technology can offer the Seafood Processing industry with both opportunities and challenges.

Key Recommendations

1. Major players should increase safety control.
2. Major players should reduce costs.
3. Major players should use blockchain to differentiate our brands.
4. Major players should ensure internal change management within organisations.
5. Major players should secure buy-in from all parties and build a blockchain ecosystem.
6. Major players should communicate with end-consumers.

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Introduction

Impact Consulting presents a consulting team to explore the potential of blockchain technology adoption in the Seafood Processing Industry.

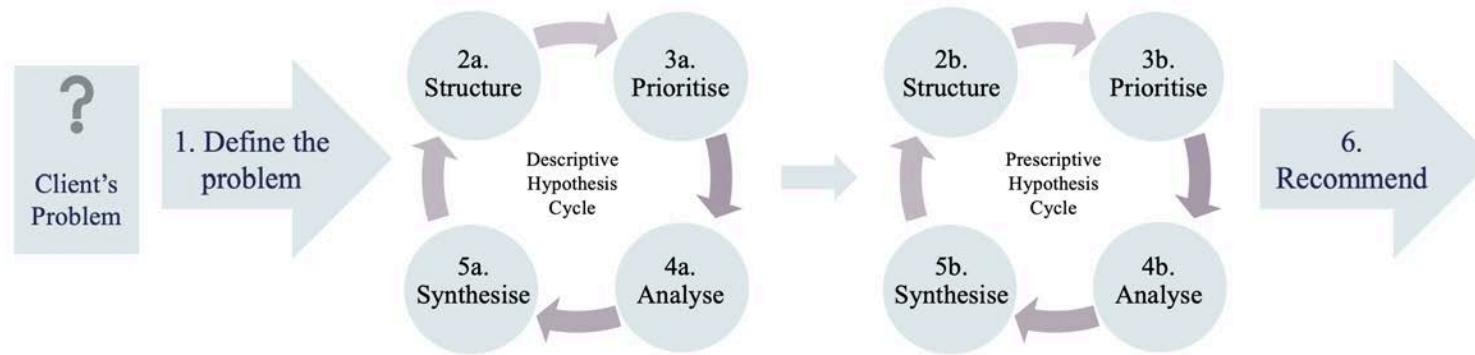
About us

Our team, **Impact Consulting**, specialises in solving problems critically, providing the best practical insights, and forming strategies for continuous long-term improvements. We aspire to capture the value and fulfill expectations at a high standard for our clients.

Project Scope and Objectives

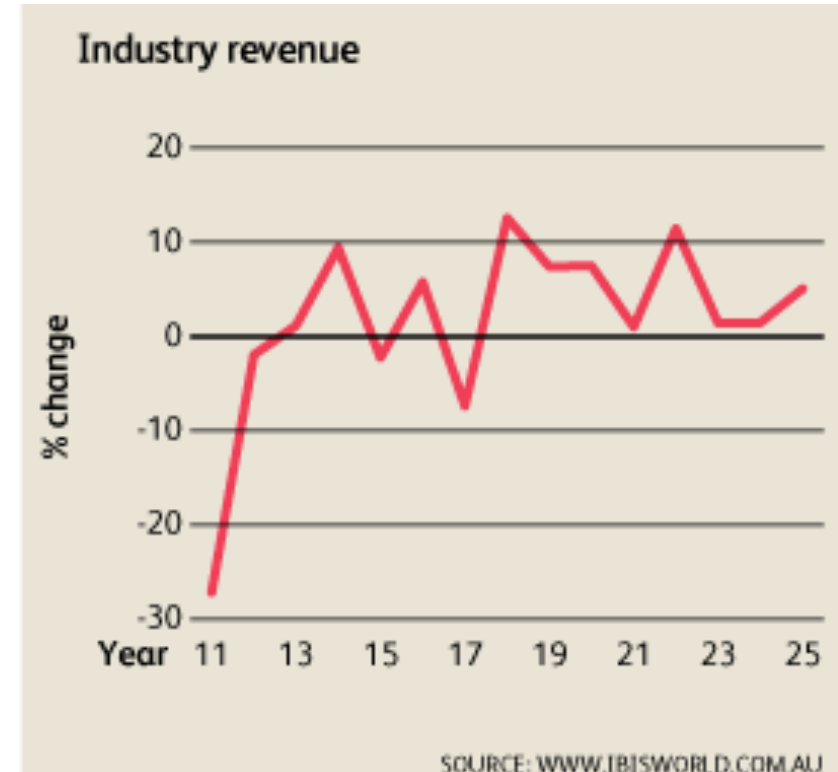
The Australian Institute of Food Science and Technology (AIFST) has shown an interest in implementing blockchain across the Australian food industry, specifically seafood processing industry. Thus, AIFST has commissioned us to research on the potential impact the adoption of blockchain may have on the domestic seafood processing industry, and the potential ways dominant players in the industry could respond.

Structured Approach



The Australian Seafood Processing Industry is currently at the mature stage of the industry life cycle.

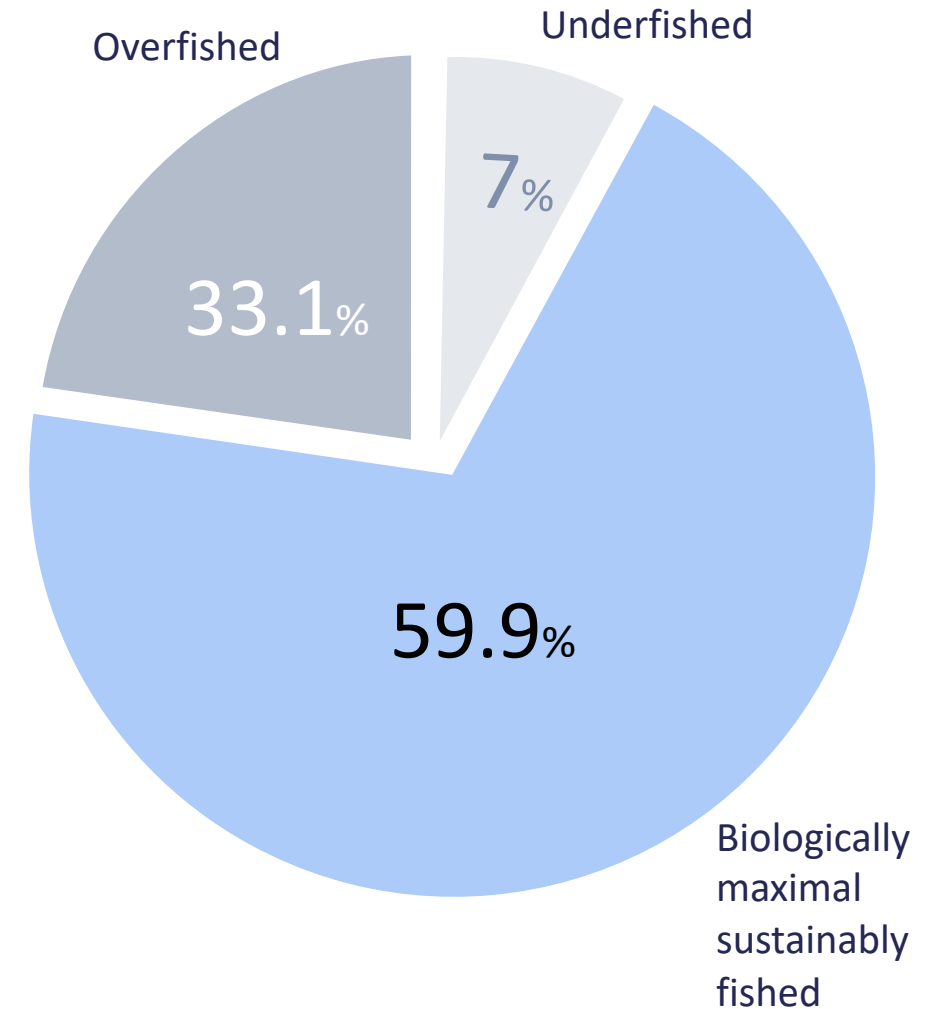
- There has been **strong industry performance** over the past **five years**, and there is a **3.0% annual growth of revenue** from 2018-19, reaching **\$1.1 billion**.³
- The industry **revenue** is expected **to increase at an annualised 4.5%** through 2023-24, to reach the goal of **\$1.4 billion**.³
- While there is **increasing competition of seafood imports** from China and South-East Asia, **domestic** seafood consumption and **prices continue to grow**. As industry operators have been **developing export channels**, the **demand** for Australian seafood exports have greatly increased.³



Despite the industry's strong performance, the growth in revenue may be the result of the global overfishing trend.

The Negatives of Overfishing:

- In 2015, Food and Agriculture Organisation of United Nations reported that since 1974, the **amount of underfished stocks** on a global scale had been **decreased consistently** to just around 7%.⁴
- More areas are being fished consistently, leaving less room for fish to reproduce and depriving more of the ocean population.⁴
- 59.9% of the global marine fishing sources were **almost at maximum sustainable yield**, which signified that areas were being fished very close to their balance threshold.⁴
- More specifically, 33.1% of the proportion was **over the maximum sustainable yield** due to overfishing. This could endanger marine species and reduce productive fish for people to obtain and consume in the future.⁴



Furthermore, the changes in external physical and social drivers can negatively impact the industry in the near future.

The seafood system operates on multiple-scale levels. The impact of different external biophysical and socio-economic drivers can affect not only food and nutrition security, but also environmental, health, and social outcomes. Each of these drivers has important implications on policy making.⁴

1

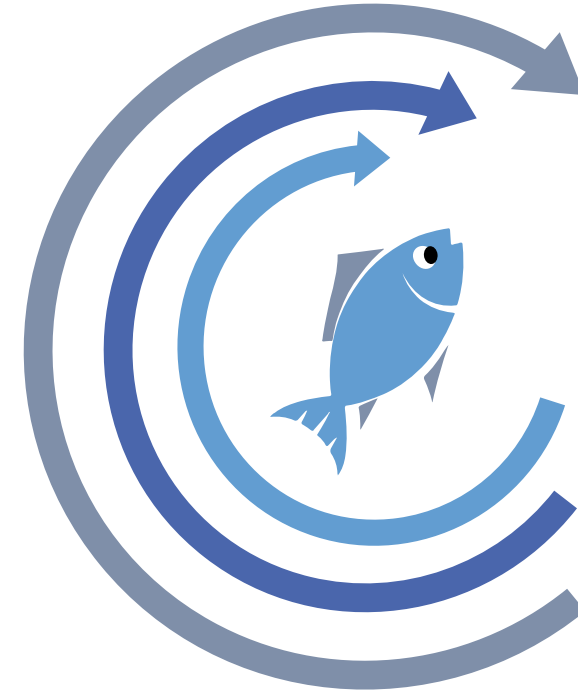
- The internal seafood system, which is consisted of the interactions between the five pillars of the system, namely outcomes of production, processing, distribution, trading, and consumption of food.⁴

2

- The change in environmental and social drivers of seafood consumption also impact the Pacific Island food systems - migration, urbanisation, demography, culture, social differentiation, politics, livelihoods, infrastructure, gender, governance.⁴
- In September 2019, Queensland Government introduces tighter regulations around fishing and caught size, which may decrease the number of fresh seafood supply, and long-term fishers.⁵

3

- Climate change is the main biophysical driver that has a great impact on the seafood system. The results of climate change are: ocean acidification, land degradation, sea-level rise, productivity, and ocean temperature change.⁴
- According to Australian Department of Climate Change, the seafood production in the next four decades will decrease by 20%, and the ocean acidification will render shelled-life-forms in the Pacific Island area inhabitable. These changes will likely create new fishing zones in the near future as sea life organisms have to change their habitats to survive.⁶



The situation analysis shows that despite the industry's strengths and opportunities, the low operational efficiency and global price war competition pose a threat to the Seafood Processing Industry.

Strengths

- The introduction of **automated production** processes enables large-scale producers to downsize labour forces, and thus lower costs.
- The investment in **new infrastructure** (i.e., storage facilities, advanced freezing and transport technologies) has helped improve product quality and quantity.³

Weaknesses

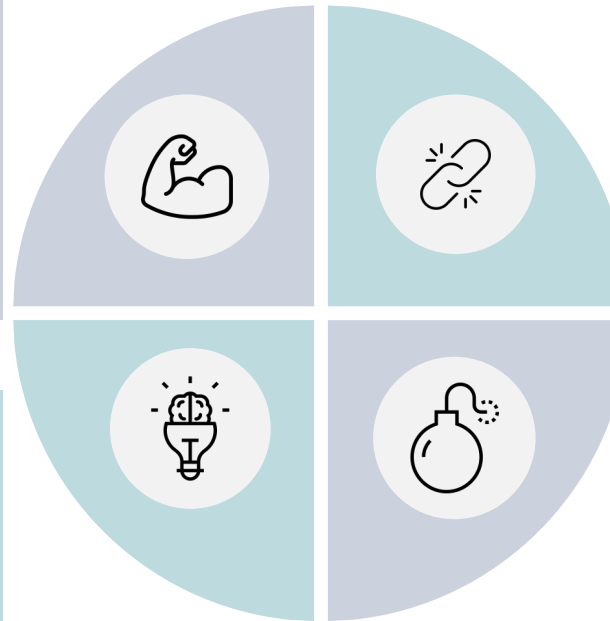
- There are **increased average wages** due to highly skilled employees requiring higher salaries.
- Products are constantly **mislabelled** during processing.
- There are large amounts of **seafood waste**.
- There is **low operational efficiency**.
- Small-scale producers lack the economies of scale to reduce operational costs and thus, are suffering from **lower profit margins**.³

Opportunities

- With a growing emphasis on **healthy eating**, consumers have come to regard seafood as a healthier choice than other protein sources.
- There is a growth in **domestic salmon consumption**, which results from successful marketing campaigns.
- There are growing **export sales**.
- Growing **disposable income** has led to rising demand for luxury seafood products.³

Threats

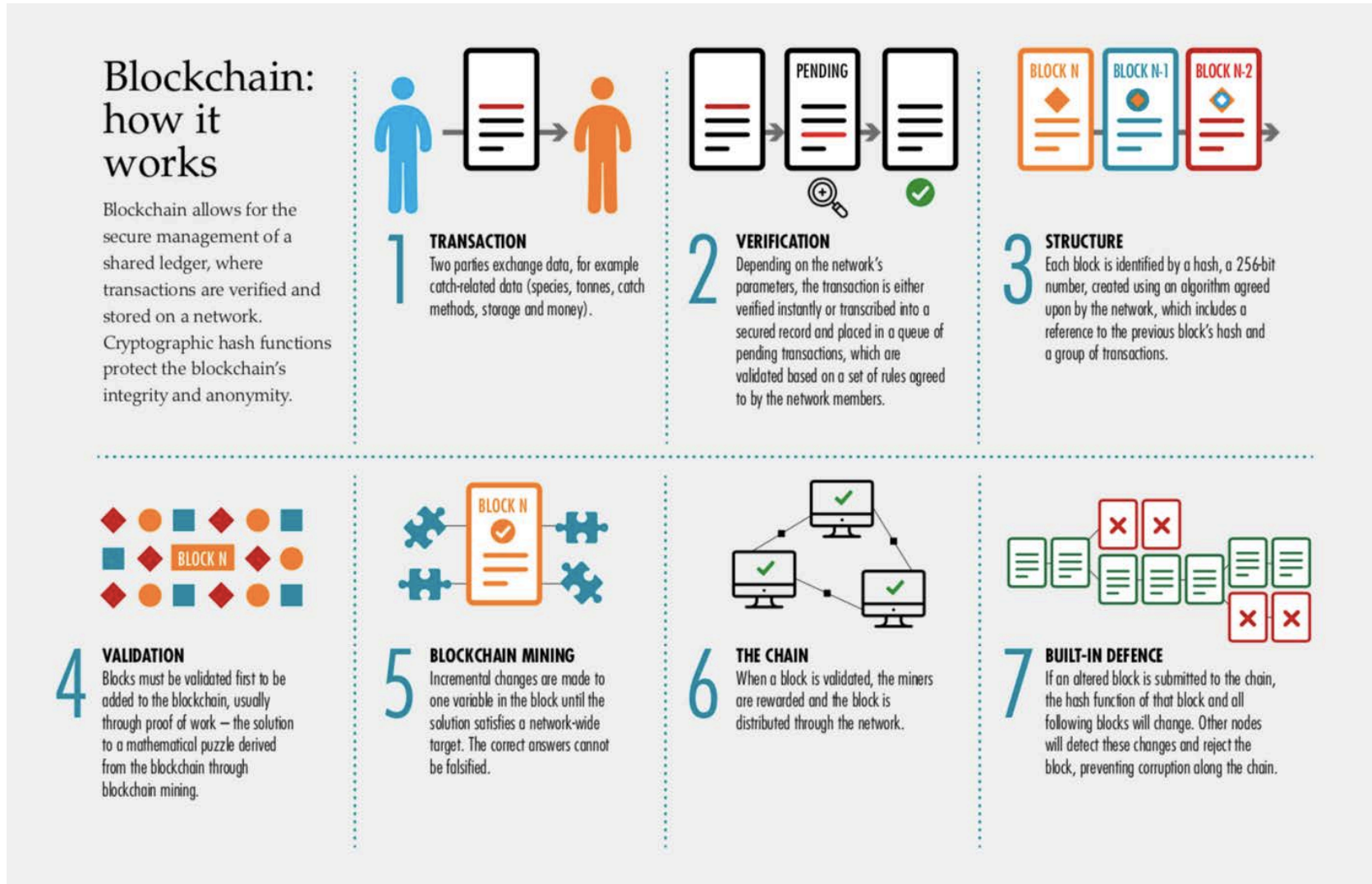
- There will be **increased competition** with **seafood imports**, particularly from South-East Asia and China where operating costs are low and free trade agreement has been implemented.
- Because of the overfishing trend, there are **stricter food safety legislations** and **fishing regulations**.
- **Increased seafood prices** may threaten industry growth given consumers may seek for alternative substitutes (e.g. meat products).³



The background of the slide is an underwater scene with a large school of fish swimming in clear blue water. Sunlight rays penetrate the surface, creating a shimmering effect. A large, semi-transparent diamond shape is overlaid on the left side of the image.

Descriptive Analysis

Hence, the adoption of blockchain technology will potentially tackle the existing problems within the industry.



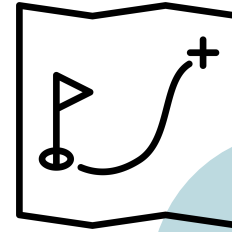
- Blockchain is a **highly trustworthy digital ledger** of transactions.⁹
- The technology uses a combination of **peer-to-peer network, cryptographic hash keys, and smart contract** to create a **built-in defence mechanism** that is **incorruptible**.⁹

Essentially, blockchain may have two main impacts on the domestic Seafood Processing Industry in Australia.



Increased Transparency

- Blockchain can increase **operational efficiency** by eliminating the involvement of middlemen, which should result in **reduced processing time**. This helps **retain freshness** of the products and also **lessen food wastage**.¹⁰
- **Real-time data reporting** is highly accessible by permitted parties at anytime.¹¹
- **Forced labour and modern day slavery** will be prohibited as parties involved are being regulated to perform according to rules and regulations.¹²



Increased Traceability

- Blockchain can **increase accountability** of every party involved. As all information is traceable within the database, it decreases the susceptibility to substitution or fraud.¹³
- The **real-time data traceability** also allows rapid response to **contamination or other food safety disasters**.¹³



Firstly, blockchain can enhance transparency by increasing the operational efficiency of the supply chain.

Blockchain technology solves the previously difficult and expensive task by providing a transparent and effective singular visual mapping of the industry's supply chain. It captures both operational data and relevant certifications about each fish caught.¹⁴



Supply

- The technology elucidates the **unnecessary steps and costs** within the supply chain (i.e., extra costs and delays caused by middlemen). Thus, **trading costs and transaction time can be reduced** accordingly, while **trade volume can be increased**.¹⁵
- Data transparency can **promote sustainable fish stocking and fishing practices** among suppliers.¹⁶

Regulation & Processing

- The integrated system allows for immediate availability of **operational and food safety verification information**.¹⁴ Real-time data provides more insights for improvement of **licence management and monitoring**.¹⁷
- The seamless information chain enhances communication and thus, **reduces conflicts** and encourages **effective product handling**.¹⁴

Demand

- Blockchain equips buyers (both wholesalers and consumers) with trustworthy information that can be accessed at real-time. This allows them to efficiently manage and validate the **legal and ethical nature of their purchases**.¹⁴
- Furthermore, the open access information to certification and verification of products can **prevent counterfeit or substitution**, and **provide ease** for buyers.¹⁴

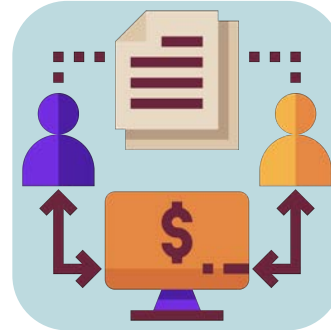
Blockchain enhances operational efficiency by providing an information sharing system that can be accessed immediately among members of the supply chain.



Transparency

Distributed Ledger Technology

The blockchain technology uses a **digital version of ledger** that allows **tracing of data throughout the supply chains**. By utilising this system, blockchain is able to increase **transparency of the individual and collective action**, and will provide **reliable provenance** of the products at a global level.¹⁸

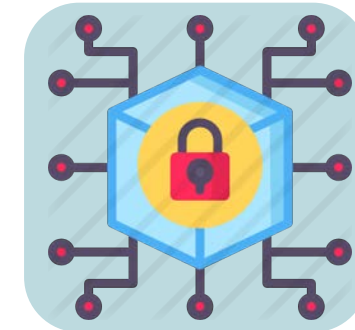


Decentralised Network

Peer-to-peer Concept

There is greater transparency with the **shared, decentralised database**, compared to the traditional centralised networks. As every transaction is recorded precisely in real-time settings, its value can be measured and efficiently viewed by every approved party.

The peer-to-peer network **facilitates communication** between **otherwise trust-less parties**, such as firms who are unfamiliar with each other, to **engage in less effortful peer-to-peer transactions**.¹²



Secure

Cryptography

Every time a business transaction is approved, it is automatically uploaded and becomes one of the **immutable and encrypted copies of information** stored in the network. Any attempt at **falsifying the data** will mean having to tamper with all copies at the same moment and thus, is **almost impossible** to do so with the blockchain technology.¹²

Moreover, blockchain increases financial efficiency by ensuring authenticity of transactions with real-time settlement that are recorded and made irreversible.

Near real-time settlement

The Blockchain technology enables the **near real-time settlement of transactions**. This **reduces the risk of non- or delayed payment** by any party.¹¹

Distributed ledger

The **peer-to-peer decentralised network** contains a **recorded history of every transaction** made within the supply chains.¹¹ Therefore, every party involved is able to access the retained proofs of transactions.

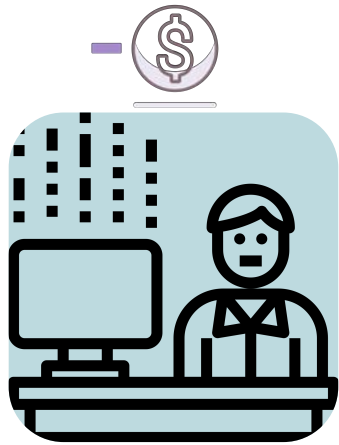
Irreversibility

The system **requires authentication of every transaction**, which are **approved through the consensus protocols** decided by every party. With data being quickly verifiable and difficult to hack, **security and privacy** are preserved.¹⁹

Censorship resistant

Once a transaction is made, it **does not allow for reversibility**.¹¹ In order to **prevent counterfeiting attempts**, there is a verifiable record of every transaction, where **no alteration** is possible **without the consensus of the majority**.¹⁹

As a result, blockchain reduces operational costs by reducing infrastructure, surveillance, and transaction costs.



Infrastructure Cost

- As verification of transactions is **automated and highly accessible** with the decentralised network, there is **less manual work needed**.
- This means they can **reduce administrative cost**, such as paperwork as they are already electronically recorded.²⁰



Surveillance & Regulatory Cost

- Processors may **reduce their surveillance cost** as the real-time reporting system allows them to access information **without manually check up** on the products.²⁰
- The integrated system may allow skipping of unnecessary steps and make **regulatory review more efficient and faster** and thus, reduces the regulatory cost.²¹

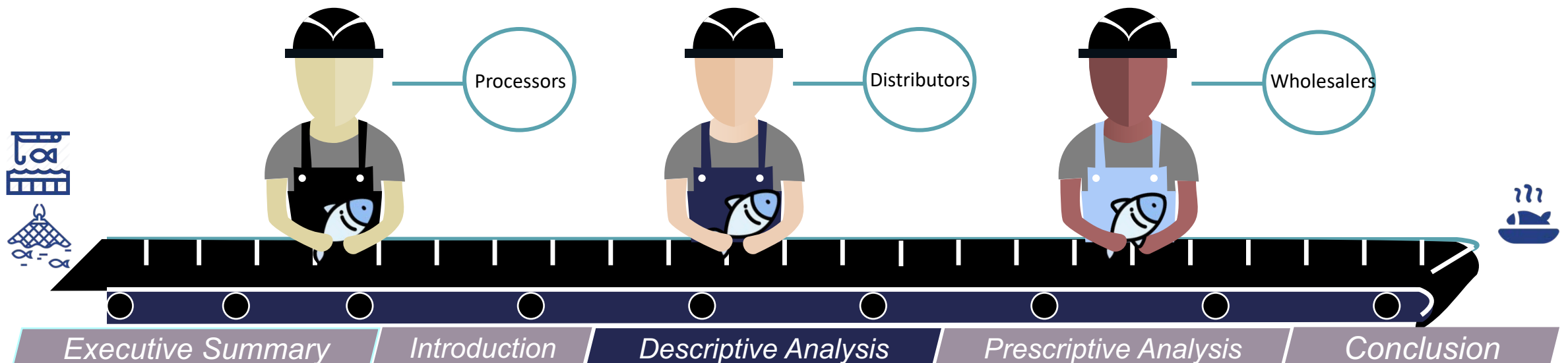


Transaction Cost

- With blockchain technology peer-to-peer network, there is **no need for intermediaries involvement** for facilitating the transactions. Hence, transaction cost between parties is reduced.²¹

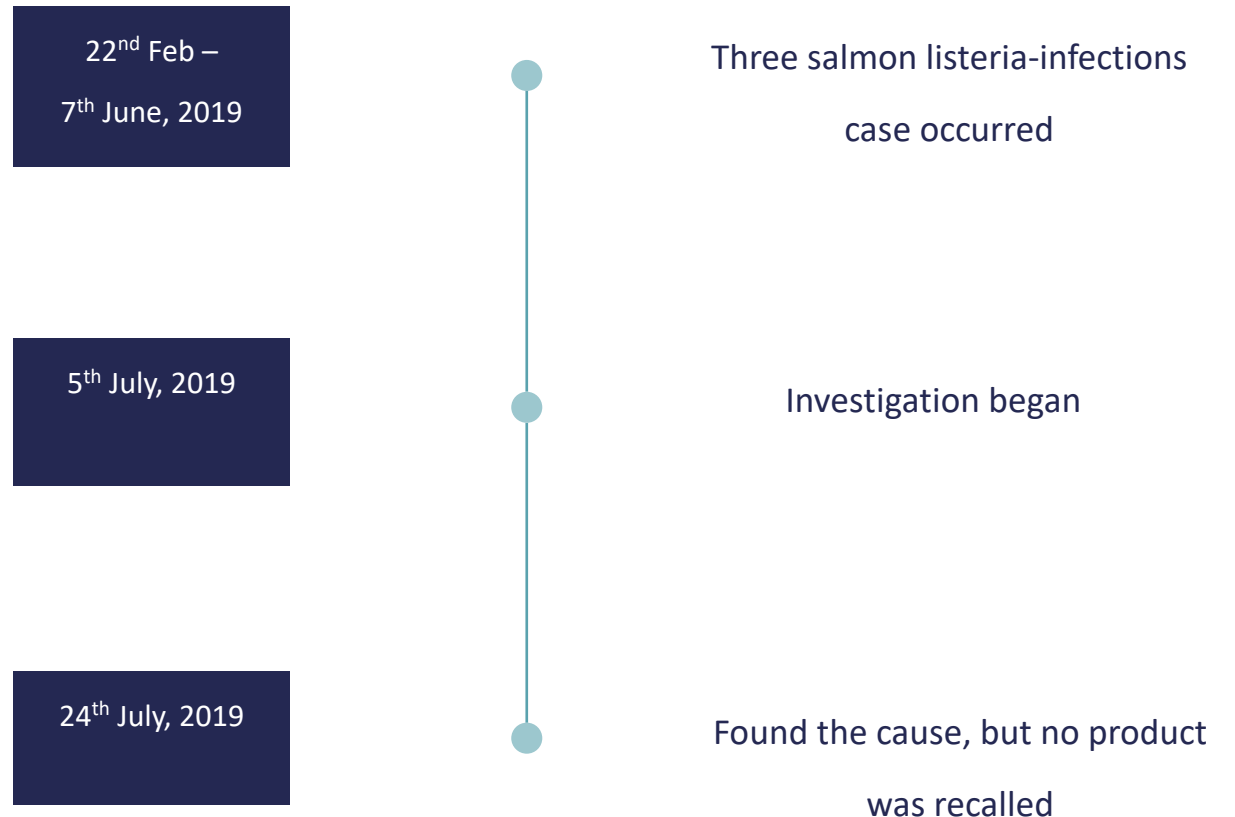
Secondly, blockchain increases traceability of products within the complex supply chains.

- The **seafood supply chains** are often **complex and ambiguous** due to their **globalised nature**. The journey of a fish from when it arrives on the fishing vessel to its ultimate fate often **involves many changes of hands** - processing, packaging, and delivering to **many different parts of the world** before reaching its final destination(s).¹⁰
- As a result, **information about seafood product in each stage of the global supply chains is nearly impossible to be accurately and effectively traced**.¹⁰
- This opaque and obscured system **opens legal and ethical loopholes for exploitation**¹⁰, such as:
 - Overfishing
 - Fraud
 - Human rights abuse



For example, the case study of ‘Smoked Salmon’ Listeria Cases in 2019 raises questions of accountability in the industry.

- From February to June 2019, **three people** from three different states (NSW, VIC, and Queensland) in Australia **contracted listeriosis linked to smoked salmon.**²²
- **Two elderly people died** from eating the listeria-contaminated smoked salmon. The third person survived.^{23, 24}
- On **5th July 2019**, the Department of Health, along with Food Standards Australia and New Zealand, and other health authorities **began their investigation** into all the cases.^{23, 24}
- The results showed that the **source of contamination** was found to be **from Tasmania.**²⁴
- **All the businesses** and domestic domain players in Australia claimed that their products passed regulation and **denied their link to the contamination. No products were recalled.**²⁵



Blockchain can increase the accountability of all parties, and limit incidents similar to the case study through the effective tracing of information.



- Traditionally, each stage of the supply chains can only trace the seafood product as far as the importer.¹⁰
- However, with blockchain, the industry can now **account for every fish caught and sold**. The traceability feature of blockchain **allows unprecedented details and accurate navigation of the seafood supply chains** from the time the product was caught to when it meets the buyers.¹⁰
- Availability of effective mean of traceability will **encourage legal and ethical practices**, while **eliminating exploitation conduct, along with illegal, unreported, unregulated, and unethical products**.²⁷ It also **allows faster and more effective recall** when incidents such as the case study happen in the future.²⁶

- The World Wild Fund for Nature (**WWF**) have partnered with **Viant** to **build a blockchain-based platform for seafood supply chain management**.¹⁰ The idea is that, right after the product is caught, it will receive an identification code or tag. The tag will allow **automatic registration at each stage of the supply chains**. Information and data from every stage of the supply chain managements will be encrypted and carried over on the identification code for the next receivers to see. **Processors can be certain of the authenticity and quality of the products before processing the products**.¹⁰
- The development stage of this platform is facing some challenges, such as **the conflict between transparency and confidentiality**, yet, the **WWF fully supports the complete implementation of blockchain to tackle the traceability problems the market is now facing**.¹⁰

Consequently, consumers can have more control over their consumption and make informed purchase decisions.

- Previously, the **lack of transparency** in both products and prices **prevents the end users** (i.e., consumers) from **knowing the provenance, what happens along the supply chain, and working conditions of people involved.**^{12, 28}
- With increased transparency using blockchain, there is **greater accountability and responsibility around human rights.** This includes workplace monitoring to halt modern day slavery and employees being exposed to hazardous chemicals and toxins.¹²
- Therefore, consumers are able to **track the relevant information** about the products and businesses through scanning barcodes and have the ability to make **well-informed decisions before purchase.**



Financial

Payments and money transfer

- Consumers can utilise the online payment system that allows for instant direct transactions from users to users.²⁹



Supply chain

Product authenticity and active participation

- Consumers are able to actively authenticate their products of interest through the scanning of barcodes.²⁹
- They will be provided with information that allows the tracking and seeing the products throughout the journey along the supply chain.²⁹

Therefore, blockchain technology can offer the Seafood Processing industry with opportunities.

Quality Assurance

The industry can **enhance product quality** by **minimising contamination and disease contraction**.³⁰

Fraud Safety

Seafood products can be **made tamper proof to prevent fraud** by tracing seafood back to its origin accurately.³¹

Distribution Opportunities

By using blockchain, the **processing is more efficient** and may lead to more distribution opportunities.³⁰

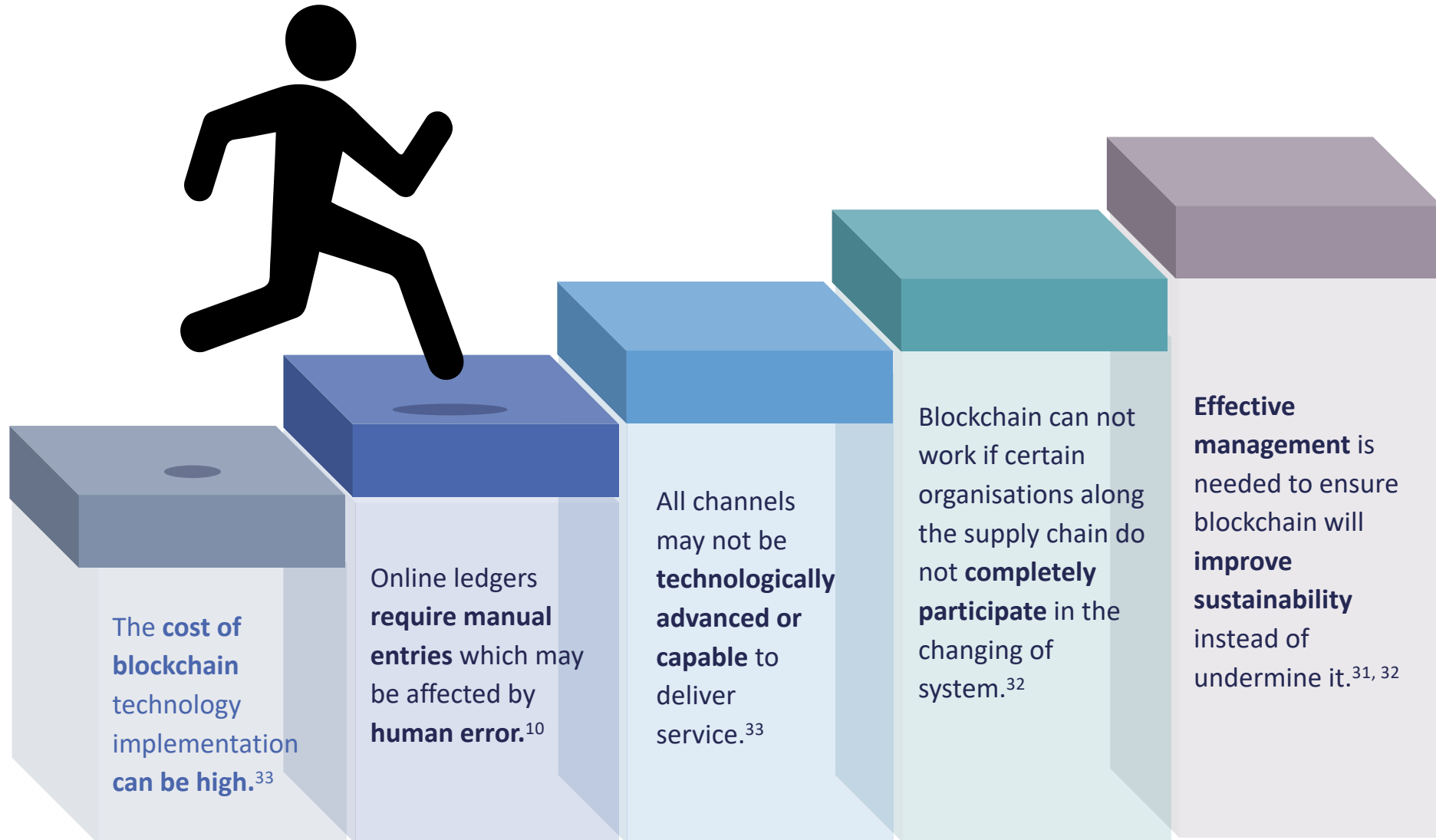
New Market

Innovative qualities of blockchain may increase attractiveness and **bring more attention to the industry**. Hence, they may attract new markets.

Trustworthiness

Key stakeholders and consumers can **be confident in their products** due to transparency.³²

However, there are still challenging steps to overcome along the way.



An underwater photograph of a coral reef. In the foreground, there are large, branching coral structures in shades of red and purple. Above them, a massive school of small, silvery fish swims in a dense, organized pattern. The water is clear and blue. A semi-transparent diamond-shaped graphic is overlaid on the right side of the image, containing the text 'Prescriptive Analysis'.

Prescriptive Analysis

Major players within the Seafood Processing Industry should embrace the changes and risks of blockchain implementation and respond with effective strategies.

Processors should increase safety control.

Processors should reduce cost.

Processors should ensure internal change management within organisations.

Processors should secure buy-in from all parties and build a blockchain ecosystem.

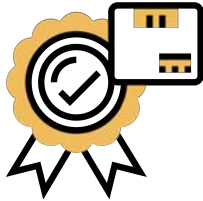
Processors should use blockchain to differentiate their brand.

Processors should communicate with end-consumers.

(See Appendix C for information on how the recommendations are derived from the prescriptive analysis)

Seafood Industry Processors can use blockchain to increase safety control in order to prevent fraud and misconduct

Ensuring safety control is essential as blockchain makes the processing procedure transparent, which holds unreported unsafe behaviour accountable. Given blockchain is an encoded digital ledger made up of digital “blocks” of data which are secured through cryptography, processors should use it to increase safety control.



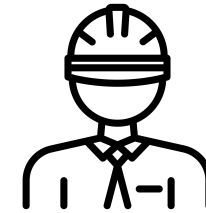
Safety Control for **Products**

- Product information cannot be tampered with once on blockchain, therefore we can **ensure the correct labelling** of the products.³⁵
- The transparent nature of blockchain also enables us to **ensure the correct handling by suppliers**.
- **Contaminated products** can be traced back easily and quickly, enabling the **supervision on the quality and freshness** of the products.



Safety Control for **Employees and Facilities**

- **Personal information** about employees can be kept safe (including birth dates, bank accounts, sensitive information).³⁶
- Facilities will not have to keep paper trails and be **at risk of losing documents**
- The transparency of blockchain requires that employees’ **personal hygiene and healthy practices** being ensured by regular supervision and training.



Safety Control for **Supervisory Department**

Supervisors can keep track of blockchain accounts for further safety of product by:

- Making sure the chain is **not tampered with**.³⁷
- Ensuring **correct implementation**
- **Updating** any misinformation or problems

In addition, Seafood Industry Processors may use blockchain to reduce cost by improving processing efficiency.

Given the high switching cost of initially adopting blockchain, processors can cut cost by implementing blockchain since the whole process can be tracked and analysed

Reduce cost by **Simplifying Channel Structure**

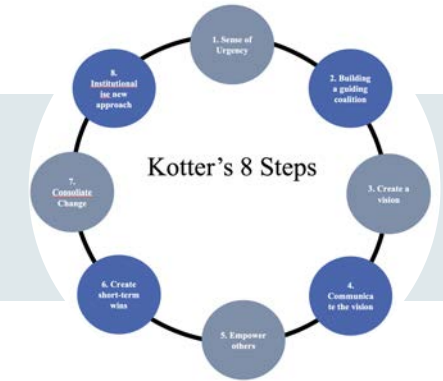
- Blockchain can eliminate some players in the supply chain by tracing down the process and improving the system through this transparency.²⁷
- Implementing blockchain means the reduction of third parties who manage transactions and keep records.³³
- There will be reduced transaction fees.
- Transportation costs will be decreased by simplifying the channel.²⁷

Reduce cost by **Increasing Operational Efficiency**

- Processors can respond to recalls in a more effective manner which would mean not having to recall all products and no cost will be lost to waste.²⁸
- Reduce costs also come from fair trade and locally sourced products.³²
- Gaps and inefficiencies can be identified by supervisors early on.
- Staff time can be reduced with blockchain efficiency thus money can be saved on employee salaries.

Moreover, dominant players should use Kotter's 8-Step Change Model for internal change management within organisations.

The processors or leaders of the seafood industry can use Kotter's 8 Steps Of Change Model³⁸ as a guiding framework to influence their groups of people to commit to and actively engage with the blockchain technology.



- | | |
|---|---|
| <p>1 <i>Sense of urgency.</i> Stakeholders should communicate the need for blockchain by pointedly explaining the problems with the organisation and the industry (i.e., seafood quality, consumer trust, and its impact on economic sustainability), and describe how blockchain can solve it.</p> | <p>2 <i>Building a guiding coalition.</i> Leaders should ensure that implementing blockchain will be beneficial for the organisations. They should seek credible people who are knowledgeable about blockchain. Change initiative should be committed among multiple hierarchies within the organisation.</p> |
| <p>3 <i>Create a vision.</i> An ideal vision of the future for seafood processing organisations should define how each department within the organisations has an essential part in achieving the desired end goal.</p> | <p>4 <i>Communicate the vision.</i> The next step is to actively communicate any successes achieved in monthly meetings, and describe the ongoing progress in the organisation's quarterly reports.</p> |
| <p>5 <i>Empower others.</i> Leaders can provide employees with training in technology use and safety protocol to provide a smooth transition for the new environment.</p> | <p>6 <i>Create short-term wins.</i> Departments who have successfully integrated blockchain should be publicly recognised and rewarded, along with continuously celebrating progress and improvements to keep up the momentum.</p> |
| <p>7 <i>Consolidate change.</i> New recruits who have experience in, or have learning potential for, blockchain technology may be essential to implementing the change.</p> | <p>8 <i>Institutionalise new approaches.</i> Lastly, leaders can demonstrate the beneficial changes blockchain was able to achieve including the improvement of the organisation's reputation and trustworthiness to foster positivity towards blockchain.</p> |

Additionally, processors should encourage participation from all parties within the seafood industry and build a blockchain ecosystem.

Due to the interrelated structure of the supply chain, all parties must adopt the technology to optimise the value generated from the network effects and interoperability of blockchain.³⁹

It is necessary to secure buy-in from all levels of the supply chain.⁴⁰

All players need to participate for blockchain to be effective. For instance, when there is a food safety issue, players along all levels of the supply chain can be potential perpetrators. Therefore, all channels within the supply chain must fully adopt the technology in order to provide accurate tracking and hold the right people accountable.

We should also encourage the participation from other processing companies.

Since the potential benefits of blockchain increase with the size of the network, a balance between cooperation and competition of companies is essential. However, this process usually requires a sponsor (e.g. a regulator or industry body) to take the lead, and an assurance that the strategic incentives are aligned across players.³⁷

Consequently, processors should secure buy-in through reducing marketplace confusion and ensuring contracting.

Providing knowledge about blockchain may facilitate participation by reducing marketplace confusion.⁴⁰

Organisations may hesitate to use blockchain due to the fast-spreading negative viewpoints on Bitcoin, albeit the benefits. Since attitude is an influential determinant of behaviour, presenting all organisations with the potential benefits of the technology may change their attitudes and behaviour on blockchain adoption.

We can ensure contracting to balance confidentiality with transparency.³⁷

A major concern is that blockchain's transparency may sacrifice the company's confidentiality. Compared to public blockchains which have no central authority (e.g. Bitcoin), the permitted blockchain used in this industry allows all parties to join and read. However, only authorized parties can edit. Therefore, contracting is important to build trust between parties and secure confidentiality, where all involved can benefit from integrated data and still have control over sharing the information.

Moreover, major players should use blockchain to differentiate their brands.

Given the **increased competition** with seafood imports³, a **differentiation strategy** for domestic seafood brands are necessary. Blockchain, which ensures the safety of the products and the environmentally friendly processing procedure while simultaneously decreases costs, can be used as a **unique selling proposition** to make domestic brands different from its rivals.

Therefore, two **value propositions** are recommended for seafood processing organisations:

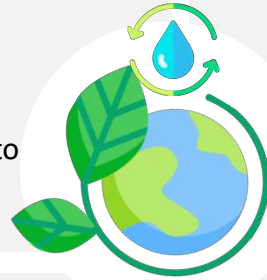


reduction can both be unique selling points to appeal to different customer segments.



Product

- Product safety should be ensured.
- Product packaging should align with the environment-friendly value proposition.
- Health- and environment-related information about the products should be provided.
- Information about cost reduction by blockchain is provided to customers to gain trust in product quality despite low pricing.



Place

- Processors should ensure the quality of sources by building long-term relationships with reliable suppliers.
- Intensive channel coverage can be adopted.
- Long-term collaborative relationships can be built with distributors and lower distribution costs.
- Players can simplify vertical channel structure and cut down unnecessary middlemen to reduce cost.



Promotion

- Product safety and sustainability should be advertised through media platforms to appeal to health-conscious customers.
- Players can promote through speeches on how the new processing procedure ensures increased sea-life and marine sustainability to appeal to environment-conscious customers.
- Players can advertise on lowered price to appeal to price-conscious customers.
- Players can do sales promotion for both customers and distributors.



Price

- Adopting everyday low-price strategy



Last but not least, the processors of the seafood industry should communicate with end-consumers about what blockchain has to offer.

This can be done by communicating provenance knowledge of blockchain, which is promoting transparency in terms of how seafood is caught, stored and delivered to retail shops and to consumers.⁴¹

This can lower consumers' perceived risk of seafood fraud, and increase the assurance of high quality product.

A blockchain-integrated mobile app can be created for consumers to verify products.



Customer rewards can be increased by allowing customers to earn points across retailers.⁴²

Adjustments can be made to promotional campaign, promoting freshness, health, and environmental sustainability.

Processors can get verification for sustainably caught seafood from certification programs (i.e., Marine Stewardship Council; MSC).

An underwater scene with various fish swimming in clear blue water. A large stingray is visible in the lower right. Sunlight rays penetrate the water from the top. A semi-transparent diamond-shaped box is overlaid on the left side of the image.

Conclusion

To summarise, Impact Consulting has identified several key insights with recommendations for Australian major seafood processing companies upon adopting blockchain.

Key Insights

Implementing blockchain technology to Australian domestic Seafood Processing Industry can bring both opportunities and risks for seafood processing major players. Several insights were identified by the present analysis.

- Blockchain can enhance transparency by increasing operational efficiency of the supply chain.
- Blockchain increases traceability of products within the complex supply chains.
- Blockchain can increase the accountability of all parties.
- Consumers will have more knowledge and control over making informed purchase decisions.
- Blockchain technology can offer the Seafood Processing Industry with both opportunities and challenges.

Recommendations

To tackle the potential changes and risks of implementing blockchain technology to Australian domestic Seafood Processing Industry, a few recommendations for major players were presented.

- Safety control should be increased.
- Costs should be reduced.
- Blockchain should be used as a brand differentiation strategy.
- Internal change management should be conducted within organisations.
- Buy-in from all parties should be secured to build a blockchain ecosystem.
- Communication with end-consumers should be targeted.

Nonetheless, there are still limitations in our analysis that should be addressed.

Limitations

While the current report provides a succinct analysis and recommendations, there are still limitations to the approach of adopting blockchain within the industry. A few points are not included in the current report due to limited database access.

- Approaches to evaluate the implementation effectiveness and efficiency are not included.
- Risk analysis and corresponding coping strategies are not included.
- Primary research within organisations is not discussed.
- Since blockchain in the Australian food industry is yet to be explored, the generalisability of the recommendations might be limited.
- The potential for human error still exists within blockchain as the online ledger requires manual entries.

Recommended Next Steps

Given the limitations of the present report, future analysis should be focused on the following steps.

- Earned Value Analysis can be used as a technical analysis to assess the effectiveness and efficiency of the implementation.
- Risk assessment can be conducted for different companies before blockchain adoption, and individualised strategies can be used correspondingly.
- Future research should conduct primary research rather than solely relying on secondary research.
- There should be a consideration for combining blockchain with other technologies to increase data storage capacity and efficiency.



Thank You for Your Attention.

Word Count: 4554

References

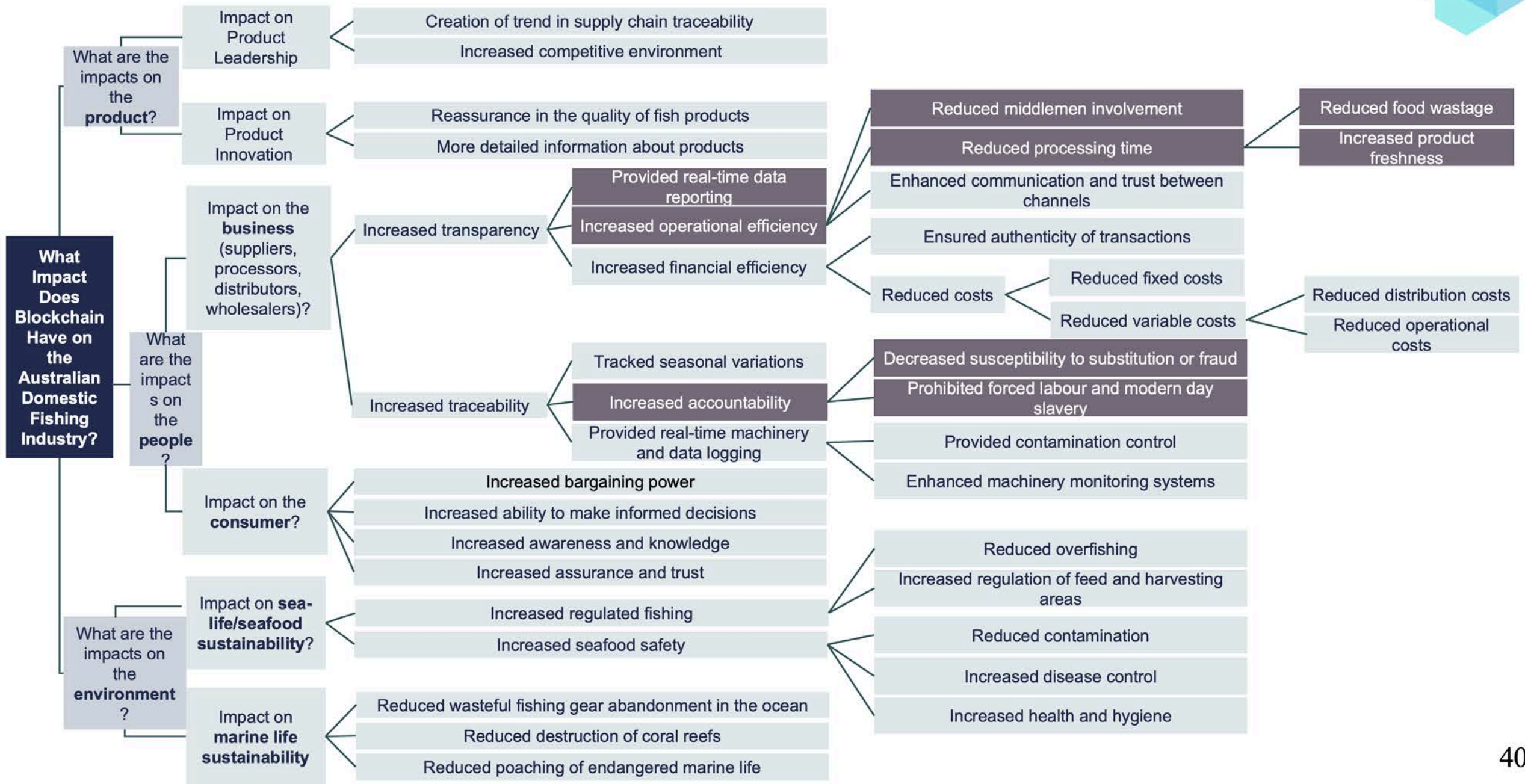


1. Fifth annual world oceans day photo competition. World Oceans Day. June 2019. Available from: <https://www.unworldoceansday.org/index.php/spotlight-article/>
2. Neubert J. The schools to beat in the national ocean sciences bowl. Institute of Competition Sciences [Internet]. 2019 May 13 [cited 2019 Oct 2]. Available from: <https://www.competitionsscience.org/>
3. IBIS World. Australia's largest provider of industry-based research [Internet]. [cited 2019 Sep 8]. Available from: <http://clients1.ibisworld.com.au.ezp.lib.unimelb.edu.au/reports/au/industry/industryoutlook.aspx?entid=111>
4. FAO. The state of world fisheries and aquaculture 2018 - Meeting the sustainable development goals. Rome [Internet]. 2018 [cited 2019 Sep 8]. Available from: <http://www.fao.org/3/i9540en/i9540en.pdf>
5. McKillop C, Major T. Queensland fisheries face tighter regulations, but industry is not happy. ABC News [Internet]. 2019 Sep 8 [cited 2019 Sep 8]. Available from: <https://www.abc.net.au/news/rural/2019-09-08/queensland-fisheries-changes-spark-outrage-among-industry/11468658>
6. Timms P. World's oceans at a tipping point, indicates un's intergovernmental panel on climate change report. ABC News [Internet]. 2019 Sep 26 [cited 2019 Sep 8]. Available from: <https://www.abc.net.au/news/>
7. Commonwealth of Australia. Climate change risks to australia's coast. Department of Climate Change [Internet]. 2010 Feb 23 [cited 2019 Sep 10]. Available from: <https://www.environment.gov.au/system/files/resources/>
8. McEntee C. Join the effort to improve the health of our oceans. Earth & Space Science News [Internet]. 2019 May 28 [cited 2019 Sep 10]. Available from: <https://eos.org/agu-news/>
9. Piscini E, Guastella J, Rozman A, Nassim T. Blockchain: Democratized trust - distributed ledgers and the future of value. Deloitte Insights [Internet]. 2016 February 24 [cited 2019 Sep 10]. Available from: www2.deloitte.com/insights/us/en/focus/tech-trends/2016/
10. Cook B, Zealand WN. Blockchain: Transforming the seafood supply chain. World Wide Fund for Nature. 2018 [cited 2019 Oct 17];1–41. Available from: http://awsassets.wfnz.panda.org/downloads/draft_blockchain_report_1_4_1.pdf
11. Deloitte Development. Blockchain technology and its potential impact on the audit and assurance profession. Chartered Professional Accountants Canada [Internet]. 2017 [cited 2019 Oct 10]. Available from: <https://www.aicpa.org/content/dam/aicpa/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/>
12. Voshmgir S. Blockchain and sustainability. Medium [Internet]. 2018 [cited Sep 22]. Available from: <http://medium.com/crypto3conomics/>
13. Galvez JF, Mejuto JC, Simal-Gandara J. Future challenges on the use of blockchain for food traceability analysis. Trends in Analytical Chemistry [Internet]. 2018 [cited 2019 Oct 17];107:222–32. Available from: <https://search.ebscohost-com.ezp.lib.unimelb.edu.au/login.aspx?direct=true&db=ffh&AN=2019-04-Ac4975&site=eds-live&scope=site>
14. Blohmke J, Deloitte, Edgren S. Blockchain in the seafood industry: Increasing transparency and efficiency in global seafood supply chains. Deloitte AS [Internet]. 2019 March [cited 2019 Sep 16]. Available from: <https://safety4sea.com/wp-content/uploads/>
15. Deloitte Development. Blockchain technology and its potential impact on the audit and assurance profession. Chartered Professional Accountants Canada [Internet]. 2017 [cited 2019 Oct 10]. Available from: <https://www.aicpa.org/content/dam/aicpa/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/>
16. Pal O, Alam B, Thakur V, Singh S. Key management for blockchain technology. The Korean Institute of Communications and Information Sciences (KICS) [Internet]. 2019 Aug 11 [cited 2019 Oct 2]. Available from: <https://www.sciencedirect.com/science/article/pii/S2405959519301894>
17. Voshmgir S. Blockchain and sustainability. Medium [Internet]. 2018 [cited Sep 22]. Available from: <http://medium.com/crypto3conomics/>
18. Tijan E, Aksentijević S, Ivanić K, Jardas M. Blockchain technology implementation in logistics. Sustainability. 2019 Feb 23; 11(4): 1-13.
19. Pal O, Alam B, Thakur V, Singh S. Key management for blockchain technology. The Korean Institute of Communications and Information Sciences (KICS) [Internet]. 2019 Aug 11 [cited 2019 Oct 2]. Available from: <https://www.sciencedirect.com/science/article/pii/S2405959519301894>

20. Ko T, Lee J, Ryu D. Blockchain technology and manufacturing industry: Real-time transparency and cost savings. *Sustainability*. 2018; 10(11): 1-20.
21. Blockchain technology threatens the middleman; Advocates of the digital record-keeping system say it can streamline the transaction process, reduce fraud, cut costs. *Globe & Mail (Toronto, Canada)* [Internet]. 2018 [cited 2019 Oct 18]; Available from: <https://search-ebshost-com.ezp.lib.unimelb.edu.au/login.aspx?direct=true&db=edsgov&AN=edsgcl.523214648&site=eds-live&scope=site>
22. 'Smoked salmon' listeria kills two in australia. *BBC News* [Internet]. 2019 July 24 [cited 2019 Sep 26]. Available from: <https://www.bbc.com/news/world-australia-49094165>
23. Chrysanthos N. Two die in nsw and victoria from listeria infection linked to smoked salmon. *The Sydney Morning Herald* [Internet]. 2019 July 24 [cited 2019 Sep 26]. Available from: <https://www.smh.com.au/national/>
24. Ho V. What is listeria and how does it spread in smoked salmon? *The Conversation* [Internet]. 2019 July 26 [cited 2019 Sep 26]. Available from: <http://theconversation.com/>
25. Welsh S. No salmon products recalled despite listeria deaths in victoria and nsw. *Herald Sun* [Internet]. 2019 July 25 [cited 2019 Sep 25]. Available from: <https://www.heraldsun.com.au/news/victoria/>
26. What are the benefits of blockchain in supply chain management? *Consensus* [Internet]. 2019 [cited 2019 Sep 26]. Available from: <https://consensus.net/enterprise-ethereum/use-cases/supply-chain-management/>
27. Splitter J. What can blockchain really do for the food industry? *Forbes* [Internet]. 2018 Sep 30 [cited 2019 Oct 2]. Available from: <https://www.forbes.com/sites/jennysplitter/>
28. Schlegel M, Zavolokina L, Schwabe G. Blockchain technologies from the consumers' perspective: What is there and why should who care? *Proceedings of the 51st Hawaii International Conference on System Sciences 2018*.
29. OSA Decentralized. AI-powered, big data manages critical retail efficiency in real-time [Internet]. 2018 May 11 [cited 2019 Oct 2]. Available from: <http://osadc.io/ru/media/nextbigfuture/20180511/>
30. del Castillo M. Blockchain's Movable Feast: How The Tech Is Changing Food Supply Chains [Internet]. *Forbes*. 2019 [cited 3 October 2019]. Available from: <https://www.forbes.com/sites/michaeldelcastillo/2019/01/08/blockchains-moveable-feast-how-the-tech-is-changing-the-way-we-eat-2/#5676cbdd17f3>
31. Georgiou M. How Blockchain Can Cut Wasted Business Costs [Internet]. *business.com*. 2018 [cited 11 October 2019]. Available from: <https://www.business.com/articles/how-blockchain-can-cut-wasted-costs/>
32. Galvez JF, Mejuto JC, Simal-Gandara J. Future challenges on the use of blockchain for food traceability analysis. *Trends in Analytical Chemistry* [Internet]. 2018 [cited 2019 Oct 17]; 107: 222–232. Available from: <https://search-ebshost-com.ezp.lib.unimelb.edu.au/>
33. Browne R. Five things that must happen for blockchain to see widespread adoption, according to Deloitte. *CNBC* [Internet]. 2018 Jan 10 [cited 2019 Oct 10]. Available from: <https://www.cnbc.com/>
34. Ocean Underwater HD Wallpaper. HD Wallpaper: Billion Photos. [cited 2019 Oct 10]. Available from: <https://wallpaper.wiki/ocean-underwater-wallpaper-hd.html/>
35. Cheng S, Daub M, Domeyer A, Lundqvist M. Using blockchain to improve data management in the public sector. *McKinsey & Company* [Internet]. 2017 [cited 2019 Oct 11]. Available from: <https://www.mckinsey.com/business-functions/mckinsey-digital/>
36. Schellhase J. Opinion: How blockchain technology can reduce risks and lower costs after disasters. *Devex* [Internet]. 2018 [cited 2019 Oct 10]. Available from: <https://www.devex.com/news/>
39. Carson B, Romanelli G, Walsh P, Zhumaev A. Blockchain beyond the hype: What is the strategic business value? *McKinsey & Company* [Internet]. 2018 [cited 2019 Oct 10]. Available from: <https://www.mckinsey.com/business-functions/mckinsey-digital/>
38. Kotter, JP. Leading change: Why transformation efforts fail. *IEEE Engineering Management Review*. 1995; 37(3): 42-48.
39. Singh N. Blockchain Ecosystem: What is it about? *Apla* [Internet]. 2018 Sep 15 [cited 2019 Oct 10]. Available from: <https://blog.apla.io/>
40. Charlebois S. (2017). How blockchain technology could transform the food industry. *The Conversation* [Internet]. 2017 Dec 20 [cited 2019 Oct 10]. Available from: <https://theconversation.com/>
41. Montecchi M, Plangger K, Etter M. It's real, trust me! Establishing supply chain provenance using blockchain. *Business Horizons*. 2019; 62: 283-293.
42. Sarah A. Want to better connect with your customers? Consider blockchain. *Entrepreneur* [Internet]. 2019 June 11 [cited 2019 Oct 12]. Available from: <https://www.entrepreneur.com/article/>
43. How to draw under the ocean. *Goeasytravel.co*. [Internet]. 2019 March 6 [cited 2019 Oct 10]. Available from: <http://goeasytravel.co/>
44. Underwater Ocean Marine Life On Elphinstone Quality. *PPT Backgrounds*. 2018 Mar 25 [cited 2019 Oct 10]. Available from: <https://wallpaper.wiki/ocean-underwater-wallpaper-hd.html/>

Appendices

Appendix A: Descriptive Issue Tree



Appendix B: Prescriptive Issue Tree

How should dominant players respond within the industry?

What is the response for internal change management?

- Strategy
- Structure
- System

- Reducing costs
- Ensuring safety control
- Developing supervising safety control teams
- Developing departments to implement blockchain
- Ensuring financial planning
- Ensuring contract management

- Reducing operational costs
- Reducing distribution costs
- Safety control in products
- Safety control within facilities and employees

- Ensuring correct labelling for products
- Increasing frequency of microbiological testing
- Ensuring correct handling by suppliers
- Ensuring freshness of products
- Ensuring hygiene and health practices
- Complying with legislation and safety standards

- Staff
- Skills
- Style
- Shared Values

- Ensuring skills and safety training in current employees
- Recruiting employees experienced at blockchain implementation
- Ensuring food safety skills
- Implementing blockchain technology skills
- Establishing an internal guiding coalition
- Gaining public support from leaders
- Communicating continuous necessity of blockchain with employees
- Rewarding for participation of employees

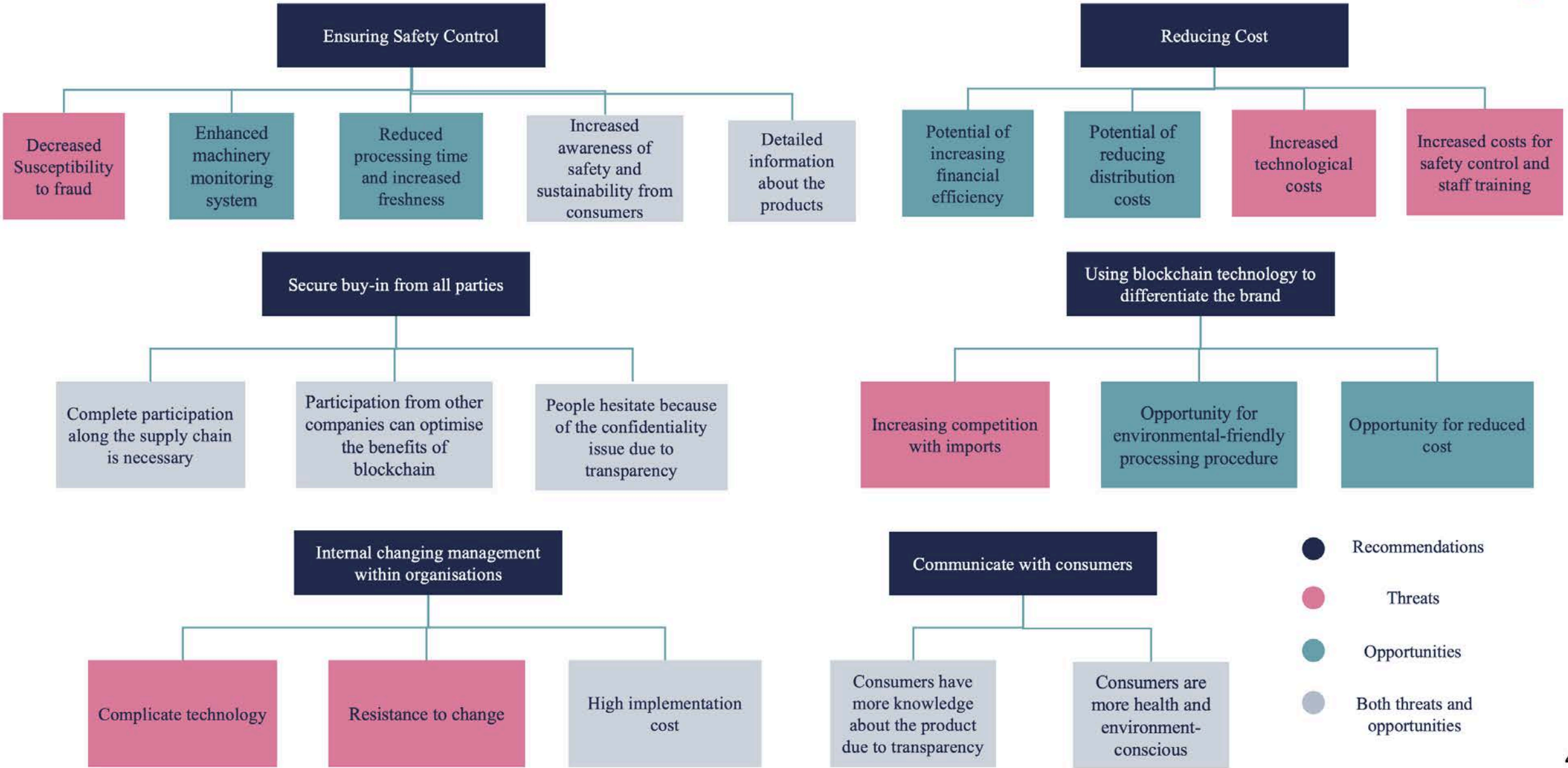
- Increasing environmental reputation
- Increasing food safety
- Embracing blockchain movement

What is the response for marketing management?

- Using blockchain technology to differentiate the brand
- Managing the supply chain
- Communication with end-consumers

- Increasing safety and environmental reputation
- Highlighting reduced price
- Securing buy-in from all levels of supply chain
- Contracting with other organisations and channels to balance confidentiality with transparency
- Simplifying vertical channel structure
- Managing feedback
- Promoting new value proposition

Appendix C: Conclusions



Team Contract

Much effort was put in in terms of creating and adhering to this team contract. Each person's role was discussed and made in agreement, in order to carry out the task efficiently with minimum conflict.

Issue Trees & Slide Deck

• Descriptive Analysis: Lan & Nina

• Prescriptive Analysis: Weixi, Ashley, & Tania

• Designer: Lan

General Tasks	Introduction	Descriptive Analysis	Prescriptive Analysis	Conclusion
1. Slide Designer and Style Editor (Lan) 2. Content Editors (Tania, Nina, Ashley & Weixi) 3. Bibliography (Ashley, Weixi, Nina, & Lan)	1. Executive Summary (Weixi) 2. Project Introduction (Impact Consulting) (Nina, & Tania) 3. Situation Analysis - Background about current situation (Everyone) 4. Current problems within the industry (Trends and drivers) (Lan) 5. SWOT Analysis (Everyone) 6. About Blockchain (Lan)	1. What blockchain would bring - Transparency + Traceability (Nina) 2. About Transparency (Lan) 3. Operational Efficiency (Nina) 4. Financial efficiency (Nina) 5. Reduction in operational costs (Nina) 6. Traceability (Lan) 7. Accountability. (Nina) 8. Case Study (Tania, & Lan) 9. Benefits for Consumers (Nina) 10. What Blockchain will bring (Nina, & Tania) 11. What to be aware of the implementation (e.g., conflicts) (Nina & Tania)	1. Project Direction (Weixi) 2. Safety Control (Tania) 3. Cost Reduction (Tania) 4. Blockchain Ecosystem (Weixi) 5. Value Propositions (Weixi) 6. Marketing Mix (Weixi) 7. Internal Change Management (Ashley) 8. Consumer Communication (Ashley) 9. Details on how to respond (Tania, Ashley & Weixi)	1. Key Insights (Weixi) 2. Recommendations (Weixi) 3. Limitations (Nina, Weixi, Ashley, & Lan) 4. Recommended next steps (Nina, Weixi, & Lan)

Signatures:

Ashley Soon

Weixi Tan

Jiratcha Runganantchai

Lan Nhu Pham

Tayida Tania Landolt

Thank you!