Are Economic Networks the Key to Successful Business Management? A Case Study of Google and Amazon

The field of network economics has transformed business management over the last fifty years by highlighting the importance of networks, coordination and relationships within organisations in achieving efficiency, growth and innovation. A better understanding of the dynamics and principles of networks has enabled firms worldwide to navigate complex internal business ecosystems (that is, the management and utilisation of staff). In the case of Amazon.com Inc. (**"Amazon"**), its management's ability to embrace network theory in order to adapt to transitions in market dynamics has played a large role towards the company's success. This paper will discuss the impact of network economics (network theory) on the management of firms and organisations generally with reference to the impact on Alphabet Inc (otherwise known as **"Google"**) and Amazon in particular.

1. What is an economic network?

An economic network can be described as a combination of "individuals, groups, or countries interacting to benefit the community as a whole"[1] where the "community" consists of the network members. The field of network economics focuses on how these networks impact economic outcomes such as production, innovation and exchange within the relevant community. A classic example of an economic network is a chamber of commerce or a department within a firm, in which departmental members are all working towards a specific goal or project outcome.

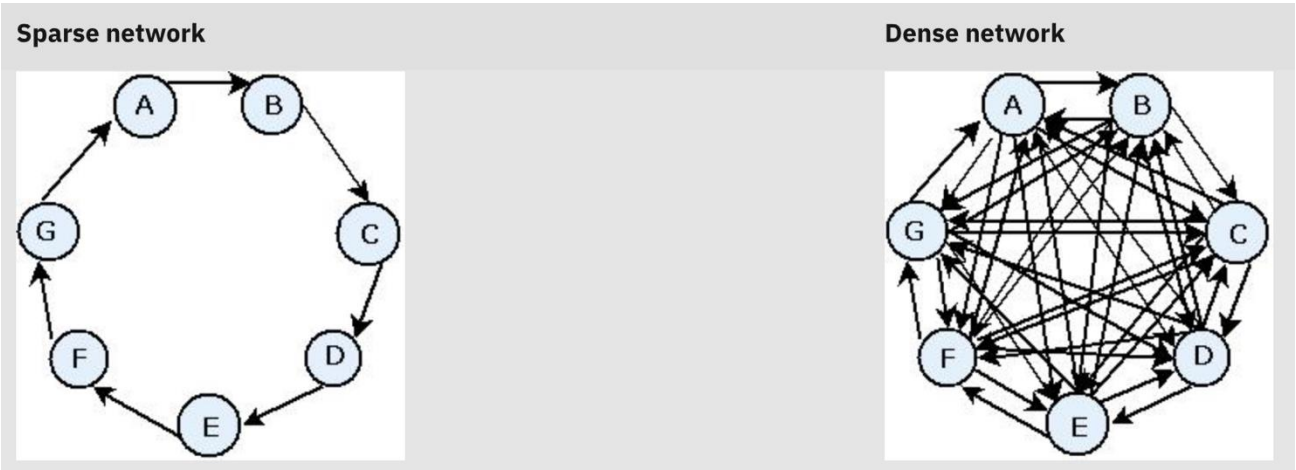
This essay will show that the cultivation of strong networks within firms enables them to maximise the efficiency of their internal business ecosystems and allow team members to adapt better to their roles and implement prescribed processes within the firm. Such benefits can be achieved due to: (i) networks' impact on information flows in organisations, (ii) the advantages arising from decentralised management structures and decision making, and (iii) the advantages of increased social capital (being the potential benefits or resources that individuals can derive from relationships).

2. Information flows

First, the connectivity of networks influences the development of information and communication flows within organisations. We can analyse the benefits of sparse networks versus dense networks by using a network diagram (figure 1), containing 7 nodes (A, B, C *et cetera*) representing agents within an organisation (that is, employees) and edges (arrows) representing connections between different nodes that information can flow through. An example of a sparse economic network could be a collection of farmers in a rural/remote area where the farmers have few employees and fewer connections or means to exchange information (new farming techniques/crop yield/weather) between staff or other agricultural professionals. On the other hand, we can imagine a dense employee network in a tech firm, such as Google where team members work collaboratively with frequently used communication channels to come up with ideas and then implement them. Figure 1 below shows that denser networks allow information to flow more easily between the nodes than in sparser networks where information must first travel through other nodes to reach its target. It

[1] Halton, Clay, *Economic Network,* October 2022, https://www.investopedia.com/terms/e/economic-network.asp

follows that the denser, more interconnected networks have more efficient communication flows than sparser, less developed networks and information *bottlenecks*[2] are significantly reduced.



network density = 0.17[3] network density = 1.0

Figure 1: sparse versus dense networks[4]

In relation to organisations, greater network density is reflective of management structures where team members (employees) actively communicate and transmit information (simply put - teamwork) that inevitably results in greater information diffusion, analysis and evolution.

Consequently, the beneficial effects of denser networks are:

i. **quicker and better-informed decision making** as greater access to information allows firms to swiftly respond to market changes and capitalise on opportunities.
ii. **resource allocation becomes more accurate** as firms gain a better understanding of where resources are in high demand and how they can be utilised.
iii. **collaboration is enhanced** as better access to information promotes knowledge sharing among employees and an environment which fosters teamwork and collaboration; and
iv. **innovation increases** as greater diversity of thought, ideas and insights among employees and teams all contribute to creativity.

2.1. Information flow at Google and Amazon

These four benefits associated with increased information diffusion have been successfully leveraged by Google. The trillion-dollar corporation is renowned for its open communication culture[5] as demonstrated by their CEO, Sundar Pichai, who

[2] "Bottleneck": refers to a point within the network where the flow of information is restricted or constrained leading to an overall less efficient information exchange process.
[3] The network density statistic is the proportion of possible edges that are actually present in the network. The sparse network has only 7 edges present out of a possible 42: 7/42 = 0.17. In the dense network on the other hand, all 42 edges are utilised.
[4] *Network density*, 04/03/2021, IBM, https://www.ibm.com/docs/en/spss-modeler/18.0.0?topic=networks-network-density
[5] Wickre, Karen, *What Google's Open Communication Culture Is Really Like,* August 2017, Wired.com, https://www.wired.com/story/what-googles-open-communication-culture-is-really-like/

said “I value teamwork quite a bit and setting up collaborative cultures is another big thing I’ve been trying to focus on”[6]. This is reflected in Google’s fun, vibrant and stimulating offices which encourage a culture of transparency, open dialogue and innovation in the workplace. Equally Google has developed a suite of communication tools such as Gmail, Google drives, Google docs and Google chat which enable agents within Google’s internal network to easily share ideas, collaborate and make quick decisions. Additionally, these products have benefited Google customers to increase information flows within their own organisations.

Amazon has also benefitted from the use of a successful information flow system. For example, the Amazon information flow system connecting the organisation to its customers is based on extensive customer data analysis and encouraging consumer feedback. Using these data and information tools, the Amazon group has managed to improve where and how resources should be allocated most effectively. The outcome is that Amazon can optimise inventory management and swiftly direct resources towards or away from the production of items following changes in consumer tastes or trends. Internally, Amazon employees will enjoy enhanced personal productivity as customer information flows translate into increased sales.

2.2. Measuring information flow and employee performance

The Google and Amazon examples demonstrate that networks of increased connectivity can lead to greater information diffusion and the four outcomes listed above which in turn have a significant impact on employee productivity and performance. However how can this impact be measured? Measuring information diffusion between agents can be challenging as studies tend to retrieve data through surveys and interviews. A study by Coleman, Katz and Menzel[7] explored how information about the adoption of a new drug would flow between doctors in a region. In order to gauge diffusion information about the drug, various doctors were surveyed and asked how and when they found out about the new drug in order to establish how quickly information was transmitted.

Whereas data from surveys is imprecise and sometimes unreliable, employee productivity and performance can be easily measured using a variety of quantitative metrics such as sales revenue, customer satisfaction and project completion rates. For example, Google measures employee performance through project-based assessments and their objectives and key results framework. In measuring the performance of warehouse personnel, Amazon use measurement metrics such as the number of units packed or shipped. The resulting data in each case is specific and accurate (unlike surveys).

2.3. Downsides of greater information flow

[6] Pichai Sundar, as cited by Sadun, Raffaella, *Google’s Secret Formula for Management? Doing the Basics Well,* August 2017, Harvard Business Review, https://hbr.org/2017/08/googles-secret-formula-for-management-doing-the-basics-well

[7] Coleman, J.S., Katz, E., and Menzel, H., “Medical Innovation: A Diffusion Study”, *Social Forces*, Volume 46, Issue 2, December 1967, Page 291.

However, excessive information diffusion and knowledge sharing can have disadvantages for employees and organisations. As communication within employee networks reach too high levels, network agents may suffer from information overload as employees struggle to filter and prioritize information most valuable to the network's goal. Additionally, increased information flow in firms raises concerns of a lack of focus and productivity with excessive communication diverting employees' attention away from primary tasks and responsibilities. Contrary to Google's policy, a range of large corporations such as Goldman Sachs, JP Morgan Chase and IBM have taken steps to restrict social media and other communication tools in the workplace. Despite the benefits of these platforms in sharing key insights and knowledge with employees, recent studies (e.g., Ahmad 2022[8]) have found that social media is responsible for losses of up to 9.5% in employee productivity. Given this data, it is difficult to justify the recommendation that managers should encourage the use of these platforms in the workplace. Moreover, increased information flow in employee networks also increases the risks of misinformation and rumours. As a consequence, a fall in productivity could occur in certain cases due to confusion and misunderstandings but it is difficult to suggest that such instances would cause a net decrease in productivity, given the benefits outlined above.

3. Centralised versus decentralised management structures.

Another factor to consider when observing the impact of management structures on information flows within firms is the degree of centralisation used by the relevant firm. A management structure is an economic network. Centralised structures have a clear hierarchal form and information primarily flows from the top down. In networks of this sort, decision making takes place far away from points of specific action. An example is McDonald's where decision making power is concentrated at corporate headquarters and individual restaurants follow standardised systems and instructions. Conversely, decentralised management structures have a reduced hierarchal structure, and each department or /node interacts equally and autonomously within the network (organisation) using ***peer to peer***[9] or ***lateral*** communication.

On the other hand, decentralised management structures lack the rigidity of centralised networks as decision-making processes are delegated throughout the organisation at departmental level to allow for more localised decision making. A distributed management structure is an extreme example or sub-category of a decentralised management structure. In a distributed network each individual within the organisation acts and communicates autonomously and is marked by the absence of teams. While distributed management structures are relatively rare and not yet used by any major corporations, Google is a well-known example of a successful decentralised management network which has incorporated elements of distributed networks. At Google, authority is dispersed among various departments and units, yet the company still provides its employees with autonomy, allowing them to make decisions within areas of their expertise.

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[8] Ahmad, M.B., Hussain, A. & Ahmad, F. The use of social media at workplace and its influence on the productivity of the employees in the era of COVID-19. SN Bus Econ 2, 156 (2022). https://doi.org/10.1007/s43546-022-00335-x

[9] Peer to peer communication is communication that takes place at the same levels of an organisational hierarchy.

The principal advantage of centralised management structures is that they can reduce administrative costs and they set out a clear chain of command. This is highlighted by McDonald's management network, where clear, standardised operations have reduced the firm's coordination costs, helping McDonald's establish themselves as preeminent in cost leadership in its industry.

However, recent empirical work concerning long-term healthcare teams in Nova Scotia, Canada between 1971 and 2011[10] concluded that centralised networks can result in less efficient information diffusion. This is largely due to information bottlenecks because information must pass through the central hub where managers can be overwhelmed with decisions. In essence, managers can lack the capacity to process information streams leading to systemic computational weaknesses within the organisation. The consequence is that centralised organisations may not always be able to fully access the benefits of efficient information flows highlighted above.

The centralised network shown in Figure 2 below is an extreme model where an absence of edges implies that colleagues do not speak at all and have no authority to make decisions. In contrast, the degree of interconnectedness in Figure 2(a) and Figure 2(b) highlight how agents/nodes in distributed and decentralised networks have quicker access to information coming from a range of sources.

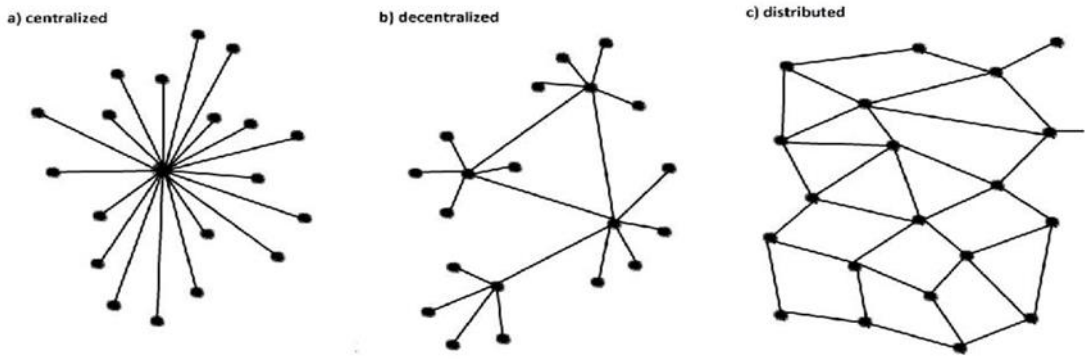

Fig 2: centralised, decentralised and distributed networks[11]

As a result, organisation structural reform is becoming increasingly common as "skeletal hierarchies are now overlaid with flexible networks and self-organizing project teams"**[12]**, rather than traditional, rigid, bureaucratic offices. An early adopter of decentralisation was General Electric Company (**"GE"**), an American multinational conglomerate. In the 1980's, GE implemented a new decentralised business strategy, delegating more authority to specific business units, which resulted in "faster decision making and greater responsiveness to the external environment"**[13]** and in turn increased competitiveness and financial performance.

[10] Scheuer, Cara-Lynn & Voltan, Annika & Chakraborty, Subhajit. (2021). Exploring the impact of decentralized leadership on knowledge sharing and work hindrance networks in healthcare teams. Journal of Management & Organization. 29. 10.1017/jmo.2020.37.
[11] Fichtner, Laura, "Techno-Politics as Network(ed) Struggles*"*, *Sciforum conference ISIS Summit Vienna* 2015, published on 30 June 2015 by MDPI https://doi.org/10.3390/isi-summit-vienna-2015-S3033.
[12] Hendry, John, *Management - A Very Short Introduction,* Oxford University Press (2013), pp. 20 – 21.
[13] Grant, Robert M., "Case Sixteen – General Electric: Life after Jack", *Contemporary Strategy Analysis,* John Wiley & Sons (2021) p 129.

GE's philosophy of a "corporation without boundaries"[14] influenced other major firms such as IBM, Toyota and Unilever to follow suit in the 90s.

3.1. Amazon's decentralised management structure

Despite having a general framework resembling a traditional hierarchal corporate structure, Amazon now incorporates thousands of hybrid project groups and appears to contain many of the features associated with decentralised management networks. Former senior manager at Amazon, Eric Heller, commented on how Amazon's highly decentralised structure, is the equivalent of "1000 independent businesses, all marching in the same direction"[15]. The company, which employs more than 1.5 million people worldwide[16], encourages "communication between various elements within its ecosystem"[17] and building strong networks among its employees. In doing so, Amazon has become a market leader in business diversification largely due to the flexibility and dynamism of its networks in response to market changes.

3.2. Amazon – room to improve?

However, Amazon's management structure could be criticised for a lack of collaboration and communication between specific teams and departments. Despite Amazon's efforts to decentralise and develop dense networks within departments, Forbes Magazine speculates that "silos are killing Amazon's potential"[18]. The company incorporates thousands of teams and departments yet is significantly suffering from a *silo effect*[19] as networks and information diffusion between teams are underdeveloped. As a result, cross-functional knowledge sharing, and collaboration is suboptimal. This is partially attributed to departments receiving too much autonomy, but it is also fuelled by competition and performance pressures between teams. Amazon should strive to develop greater connectivity between currently independent teams and reduce unnecessary competition between them in order to encourage the sharing of key insights and expertise to increase overall organisational performance.

3.3. Decentralise and thrive?

Should firms seek to decentralise? Well, it depends. Given that denser, more flexible networks foster an environment of innovation and collaboration, for tech start-ups, companies or research and development facilities it would seem irrational for them

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[14] Gilmore, Thomas., and Hirschorn, Larry., "The New Boundaries of the "Boundaryless" Company" *Harvard Business Review*, May – June 1992.

[15] Heller, Eric as cited in Stevens, Laura, "For Amazon, Can two Headquarters still Equal One Culture?", *The Wall Street Journal,* 15 September 2017, https://www.wsj.com/articles/amazon-can-two-headquarters-still-equal-one-culture-1505467803.

[16] Amazon.com quarterly financial report (December 2022), February 2023, https://s2.q4cdn.com/299287126/files/doc_financials/2022/q4/Q4-2022-Amazon-Earnings-Release.pdf, p. 14

[17] Dudovskiy, John, *Ammazon.com Inc. Report 2022,* Business Research Methodology, https://research-methodology.net/amazon-report-2/

[18] Boss, Jeff, "Silos Are Killing Amazon's Potential. Don't Let Them Kill Yours", *Forbes Magazine,* September 2017, Forbes.com, https://www.forbes.com/sites/jeffboss/2017/09/18/silos-are-killing-amazons-potential-dont-let-them-kill-yours/.

[19] Silo effect or silo mentality is a reluctance to share information with other employees within the same firm resulting in reduced organisational efficiency.

not to adopt a decentralised approach. However, in other industries, such as manufacturing for example, a centralised structure may be more appropriate. In fields of work that require little innovation or dynamism, the discounted administrative costs, stability and coordination that arise from centralisation (standardisation, economies of scale, less duplicative errors) may be more beneficial. During the Covid-19 global pandemic, the NHS's centralised structure was essential in providing the UK with one of the quickest and most effective vaccine rollouts around the world. With increased coordination, stemming from centralisation and standardised procedures, the NHS was able to outperform similar economies such as France and the Netherlands in supplying and distributing the vaccine. Therefore, although there is no definite answer to the question of centralisation for organisations, its impact on the direction firms take is significant.

4. Social Capital

Developing strong networks in organisations also contributes to the formation of improved social capital. Some academics describe social capital as the potential benefits or resources that individuals can derive from relationships[20]. Others have chosen a broader definition that includes "trust and norms"[21] existing within social relationships. Organisations in which employees are encouraged to communicate with others, share ideas or perhaps take part in social activities outside the workplace should, in theory, accumulate greater social capital. When agents within organisations have *strong ties*[22] *or* a sense of shared identity within the network (greater social capital), they are more likely to cooperate, support each other and work towards the common goal of the team. A study exploring the impact of social capital on organisations in Ghana[23], found that social capital had a significant relationship with organisational performance and that Ghanaian firms with higher levels of social capital[24] reported higher productivity at employee level and also at firm level.

4.1. "Strong Ties" versus "Weak Ties"

However, despite academic research showing the benefits of social capital in organisations such as improved team performance, increased information diffusion and greater innovation (published by Brass, Kilduff and Mehra in 2001[25] and Hanson and Krackhart in 1993[26]), Mark Granovetter's paper "The Strength of Weak ties" concludes that low levels of social capital with numerous agents can also be beneficial.

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[20] Bourdieu, Pierre and Wacquant, Loïc., *An Invitation to Reflexive Sociology,* University of Chicago Press, (1992) Chicago.
[21] Putnam, Robert D., *Bowling Alone: The Collapse and Revival of American Community,* 2001, New York, Simon & Schuster Paperbacks, (2001), New York, p. 19.
[22] Strong ties: term coined by sociologist Mark Granovetter in his paper *"The strength of weak ties"* (1973) to describe close and intimate relationships of frequent interaction.
[23] Ofori, Dan and Sackey, Jocelyn, "Assessing Social Capital for Organisational Performance: Initial Exploratory Insights from Ghana", *Organisations and Markets in Emerging Economies*, Vol. 1(2), pp. 71-91.
[24] social capital measured as a collection of variables (employee survey) including Reciprocity, Trust, Institutional Ties, Diversity of Contacts, Density of Personal Contacts and social ties.
[25] Brass, Daniel J., Kilduff, Martin and Mehra, Ajay, "The social networks of high and low self-monitors: Implications for workplace performance", *Administrative Science Quarterly*,46(1) (2001) pp. 121–146. https://doi.org/10.2307/2667127.
[26] Hanson, Jeffrey R. and Krackhart, David, "Informal networks: The company behind the chart," *Harvard Business Review,* July – August 1993.

His idea is that weak ties[27] provide unique advantages by connecting employees to broader networks and diverse opportunities that cannot be accessed by stronger ties. The theory is based on the assumption that the number of stronger ties will necessarily be fewer than a large number of weaker ties. Granovetter reached this conclusion by interviewing people in Massachusetts to find out the degree to which people found employment via social contacts. He divided such contacts into three categories according to how frequently individuals interacted together. "Strong" equated to interactions at least twice a week, "medium" equated to interactions less than twice a week but more than once a year and "weak" equated to one interaction per year or less"[28]. His research found that while only 16.7%[29] found a job through strong ties, 27.6%[30] had done so using weak ties (and 55.7% with medium ties), confirming his hypothesis. This study, backed by numerous follow-up studies (such as Friedkin in 1980[31]) concludes the importance of weak ties in the diffusion of information and forming bridges between networks that have fewer connections.

However, Granovetter's work primarily focuses on social networks rather than economic networks and the validity of weak ties theory as a case for organisational reform could be questioned. Yet Granovetter's theory has been supported by Morton Hanson's study which sourced data from a large electronics company with 120 new product development projects undertaken by 41 divisions. The study explored the importance of *weak ties* in knowledge sharing across organisation sub-units and concluded that weak cross-unit ties helped projects acquire useful knowledge from other units.[32]

4.2. Social Capital at Google and Amazon

Google's employee networks demonstrate successful development of social capital. The company's fun and relaxed work culture provides the environment needed for information diffusion to improve (as seen above) but also to build trust and confidence between employees. Over the last two decades, Google have adopted a range of successful policies to develop social capital such as their "Thank God It's Friday meetings (TGIF)"[33] and allowing employees to play ping-pong or even volleyball at work. Moreover, the company's decision to opt for open office layouts means that *weak ties* form frequently and everywhere, whether it be waiting in line at one of Google's many office café's or while taking in part in a free workout class.

In contrast, it would not appear that Amazon has optimised social capital levels within its internal networks in the same way. The corporation has faced recent controversy

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[27] *A "weak tie" is* a social relationship characterised by a lower frequency of interactions.
[28] Granovetter, Marc, "The Strength of Weak Ties", *American Journal of Sociology*, 1973, as reproduced in Jackson, Matthew O., *Social and Economic Networks*, February 2008, Princeton University Press, 101.
[29] Ibid.
[30] Ibid.
[31] Friedkin, N.E., "A Test of Structural features of Granovetter's Strength of Weak Ties Theory, *Social Networks*, 2, 411-422.
[32] Hansen, Morten T. "The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits" *Administrative Science Quarterly*, vol. 44, no. 1, 1999, pp. 82–111. JSTOR, https://doi.org/10.2307/2667032. Accessed 18 June 2023.
[33] O'Callahan, Ted, *What's the Google approach to human capital?,* Management in Practice, Yale Insights, March 2011, https://insights.som.yale.edu/insights/whats-the-google-approach-to-human-capital

regarding poor working conditions with workers commenting that their bathroom breaks are timed and that even robots "are treated better than us"[34]. Although Amazon have claimed that they use a performance-based system, policies of reprimanding idle time lasting only a few minutes do not provide the environment for significant social capital development and its benefits. However, it should be noted that the majority of such criticisms are directed towards Amazon's distribution centre personnel, rather than those involved in fulfilment and operations management, where social capital is most beneficial. In such divisions, given limited data of Amazon's internal work culture, it is difficult to gauge social capital levels within the company's offices.

4.3. Impact of Social Media Platforms on Social Capital

Despite evidence highlighting the dangers of social media on employee productivity, it is difficult to deny its benefits for the development of social capital in organisations. A study taking data from 328 employees from the telecommunications company "Tunisie Telecom"[35], revealed that social media usage in the workplace had positively influenced social capital levels and had also improved information flow, improving employee performance. Subsequently, managers should consider loosening social media policy in the workplace (except for where significant falls in productivity/focus occur), particularly given the rise of more business oriented social media platforms like LinkedIn.

4.4. What should managers strive for (social capital)?

Considering the advantages of both weak ties and social capital, managers should seek to consider their own organisations' unique needs and culture when implementing or altering a management structure. They should encourage collaboration and communication among individuals within teams and departments to build social capital in order to improve productivity and coordination within teams. However, for highly innovative industries, managers should also ensure that *weak ties* and external networks are expanded (with distant groups and individuals outside and inside the firm) to enable the flow of information that might not be immediately accessible to agents within the network. Ultimately, following a "dearth of social capital"[36] stemming from the Covid-19 pandemic, organisations should take internal action (such as organising employee social events, limiting working from home) and encourage external networking (with trade bodies, clients, customers and suppliers) to reverse sinking levels of social capital in order to achieve greater long-run employee and organisational performance.

5. Conclusion

[34] Conway, Zoe & Dearbail, Jordan, *Amazon strikes: Workers claim their toilet breaks are timed Published,* BBC News Business, January 2023, https://www.bbc.co.uk/news/business-64384287

[35] Hanen Louati & Slim Hadoussa (2021) Study of Social media impacts on social capital and employee performance – evidence from Tunisia Telecom, Journal of Decision Systems, 30:2-3, 118-149, DOI: 10.1080/12460125.2021.1872142

[36] Parsons, John and Weddle, Brooke, *Social capital: Build back better relationships at work,* October 2022, https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/social-capital-build-back-better-relationships-at-work

I believe that the answer to the question "Are Economic Networks the Key to Successful Business Management?", simply put is yes. Although the field of network economics remains an evolving area of study, it is one that in the modern era all organisations should consider carefully in order to optimise their operational efficiency, innovation and continued development.

Google's example demonstrates how the development of strong internal networks can contribute to significant advances in innovation. Its management strategy of developing information flows, social capital and highly decentralised decision-making has helped Alphabet Inc (Google's parent company) sit amongst the top 5 most innovative companies of 2022[37].

On the other hand, despite Amazon's successes in decentralising, the company has not achieved levels of social capital and information diffusion comparable to those of Google. In particular, Amazon should seek to eliminate *silo effects* from their business model, allowing specific teams and departments to work more innovatively and productively. Alternatively however, Amazon's absence of social capital and information sharing in its distribution centres highlights how low levels of social capital can be beneficial, when output is the principal concern.

Therefore, emerging start-ups should endeavour to adopt strategies that encourage information flow and the development of social capital within their core business ecosystems (e.g., product development, fulfilment and operations management). Furthered by decentralised decision making, such policies will result in more creative, innovative and flexible work environment. When considering management strategies for manufacturing and distribution processes, centralised structures and limited social capital development may be more appropriate as standardised systems can be rolled out to maximise output.

[37] Consultancy.uk, *The world's most innovative companies (according to BCG),* September 2022, https://www.consultancy.uk/news/32425/the-worlds-most-innovative-companies-according-to-bcg#:~:text=For%20the%20second%20consecutive%20year,2021%2Dedition%20of%20the%20list.

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