

ONDC Adoption by Sellers: Key Challenges

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Abstract—India has made significant progress in its digital transformation journey creating an impressive global footprint with its futuristic digital innovations, supporting technologies and scalable architecture. India's flagship program 'Digital India' along with 'India stack' are the building blocks that accelerated the development of Digital Public Infrastructure (DPI). Digital commerce has a high potential to fuel economic growth further, but current penetration is only seven percent of overall market, restricted by multiple barriers. In 2021, India kickstarted its ambitious plan to democratize e-commerce with Open Network for Digital Commerce (ONDC) envisioned to create an inclusive ecosystem for e-commerce that enables even the smallest of Indian merchants to reap benefits of e-commerce. ONDC is intended to curb digital monopolies/duopolies and make it a level playing field with higher inclusion. ONDC was incorporated in 2021 as a Section 8 company and its pilot phase was launched in 2022. The current statistics shows an increased presence, but the growth is much lesser compared to major e-commerce platforms. There are quite a number of challenges ONDC needs to overcome. This study focused on identifying and ranking the seller network participant challenges using fuzzy AHP methodology. ONDC-related technical and operational challenges are identified as the major challenges followed by seller participant awareness and acquisition, overall cost of adoption, competition from existing giants and scalability issues. The government should work with ONDC leadership to resolve these pressing roadblocks at the earliest to reach its full potential with expanded market share across India becoming the UPI of digital commerce. The success of this unique tech-based open e-commerce network can become a great example and model for adoption by nations across the world who are facing similar challenges.

Keywords—ONDC, Open Network for Digital Commerce, Challenges, Seller Network Participant, Marketplace, Seller

I. INTRODUCTION

India is one of the largest and fastest growing digital economies of the world. India has made significant progress in its digital transformation journey creating an impressive global footprint with its futuristic digital innovations, supporting technologies and scalable architecture. India's digital landscape has a favourable environment for rapid growth because of increased smartphone adoption by the general public, cost-effective high-speed data plans, user-friendly digital payment channels, a large IT talent pool and supportive policies by the government for digitalization. India's flagship program 'Digital India' along with 'India stack' are the building blocks that accelerated the development of Digital Public Infrastructure (DPI).

Digital commerce has a high potential to fuel economic growth further, but current penetration is only seven percent of overall market restricted by multiple barriers. In 2021, India kickstarted its ambitious plan to democratize e-commerce with Open Network for Digital Commerce (ONDC) envisioned to create an inclusive ecosystem for e-commerce that enables even the smallest of Indian merchants to reap benefits of e-commerce. Currently, Indian e-commerce is

dominated by large players which is out of reach for the majority of MSMEs and rural players. ONDC program is intended to curb digital monopolies/duopolies and make it a level playing field with higher inclusion. It aspires to become UPI of e-commerce by making e-commerce procedures open source, non-platform-based, decoupled, inter-operable, transparent, scalable, secure and cost-effective.

ONDC was incorporated in 2021 as a Section 8 company with dedicated advisory council. Key roles in ONDC include buyer and seller network participants, logistic service providers and ecosystem participants. Pilot phase was launched in 2022 in grocery and food delivery segments in five major cities. The current statistics show an increased presence in 449 cities with 1.79 lakh plus registered sellers, but the growth and transaction count are much lesser compared to four lakh plus sellers in major e-commerce platforms. There are quite a number of challenges ONDC needs to overcome. Implementation of ONDC is much more complex than that of UPI considering the number of players and steps involved. Other challenges include high competition from established players, ensuring product quality, user awareness and engagement, timely shipments, after-sales support technology support and data privacy. It is important for the government to understand the most pressing challenges faced by sellers in adopting ONDC, so that changes may be brought in or support may be given by the government/ONDC accordingly. This study strived to identify the key challenges faced in the adoption of ONDC by sellers using the Fuzzy AHP approach. The results of the study can significantly aid in the successful implementation and widespread acceptance of this digital commerce framework by ensuring that the platform is responsive to the needs of its users. Thus ONDC can position itself as a viable and attractive option for sellers in the Indian market which in turn can lead to fostering a larger and more vibrant digital commerce ecosystem becoming another example for the world similar to the UPI program.

II. LITERATURE REVIEW

A. India's Digital Transformation Journey

India has made significant progress as a digital nation and has become the world's second largest digital economy in terms of internet users[1]. Digital India, the flagship programme envisioned by Government of India focuses on development of digital infrastructure, supporting services and citizen empowerment to transform India to a digital empowered society and knowledge economy[2]. The vision of Digital India program is the digital empowerment of every Indian and digital availability of every information [3]. To support this great vision, India has successfully developed India Stack, the digital public infrastructure (DPI) with three different layers. Unique identity – Aadhaar forms the foundation layer, followed by complementary payment systems including UPI as the next layer and data exchange as the top layer [4]. India has taken bold steps to reduce the digital divide with the improvement of digital literacy programs like the National Digital Literacy Mission (NDLM),

followed by Digital Saksharata Abhiyan (DISHA) providing basic digital literacy training. The success of these initiatives led to Pradhan Mantri Gramin Digital Saksharta Abhiyaan (PMGDISHA) launched in Feb 2017 to make six crore persons in rural areas digitally literate. E-Governance helps the common man to access necessary services with transparency and fairness. These digital initiatives act as catalysts for rapid economic growth [3]

B. E-Commerce Landscape in India

The global economic landscape is changing rapidly to a digital-based one where digital-based commerce has gained significant importance. E-commerce provides companies and small businesses access to new commercial prospects, an inclusive playing field with the potential to expand [5]. E-commerce denotes the conduct of business through electronic means or online encompassing purchase, delivery, payments and supply chain management. It is also referred as click and buy model and mainly exists in business variants like business-to-business(B2B), business-to-customer(B2C), direct to consumer (D2C) and business-to-government (B2G) [6]. Since 1995, e-commerce has been developing globally with rapid internet and smartphone adoption, urbanization and increased consumer spending. COVID-19 fuelled the growth further across the globe in the B2C and B2B sectors[7].

E-commerce industry was started in India in the year 1991 with liberalisation and IT boom. It gained significant attention and momentum in the recent few years with affordable internet connectivity and smartphone penetration [8]. This was further accelerated by COVID-19 pandemic compulsions[7]. E-commerce in India has high growth potential and is expected to reach a market size of USD 188 billion by 2025[9]. India's retail landscape is large with 12 million plus sellers and resellers. But only a negligible, 15,000 claim to have a digital presence. India is also trailing behind in e-commerce adoption by the majority of its citizens, especially in rural areas. India's e-retail penetration is much lower only 4.3 percent compared to that of UK (23 percent), China (25 percent) and South Korea (26 percent) [10].

Indian e-commerce landscape is platform-centric and a closed network dominated by monopolies and duopolies. Confederation of All India Traders (CAIT) has highlighted need for a level playing field and robust policies in e-commerce to help small players to grow and curb unethical business practices such as priority to certain sellers and price distortion[11], [12]. These marketplaces levy high commission charges of 25 to 35 percent and give priority to their private label items in ranking. Another main issue is the no transferability of ratings and reviews. Their policies are usually one-sided and lack transparency[13]. Other issues include predatory pricing, preferential treatment of sellers, and exclusive arrangements with prestigious brands which makes small players' entry difficult making this an uneven field[14].

Small and medium enterprises (SME) are economic powerhouses and development tools for emerging economies. They foster entrepreneurship, rural economy and thus improve income distribution, employment generation and poverty reduction. The introduction of e-commerce in SMEs are beneficial for value addition and business expansion. But leaner financial strengths and budget constraints prevent SMEs from venturing to online infrastructure or competing with bigger players [15] India's retail industry majorly includes

1.2 crore Kirana stores which are digitally excluded and faced huge challenges during COVID -19 pandemic [7].

C. Open Network for Digital Commerce (ONDC)

To overcome the challenges, India came up with ONDC whose mission is to democratize digital commerce and increase its penetration by enabling all types and sizes of sellers. It is a paradigm shift from a monolithic marketplace model to a facilitator-driven interoperable model. It is a tech-based initiative through Blockchain technology and Beckn-based open protocols and open-source specifications[16].

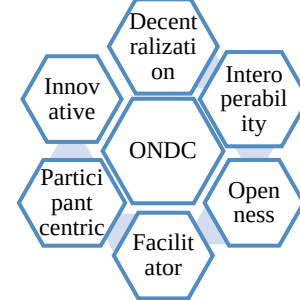


Fig.1: Foundation Principles of ONDC

Source: ONDC website

Need of ONDC emerged during Covid wave where problems of undigitized ecosystem emerged. The journey of ONDC began in June 2021 with the establishment of an advisory committee and the onboarding of leadership team by DPIIT. ONDC was registered as a private non-profit Section 8 company in December 2021[10]. ONDC alpha phase got launched across 86 cities in groceries, food & beverages in April 22 along with delivery of first order in Bangalore. Expansion to other cities and beta launch happened by September 2022. As of September 2023, the network has eight domains which include food and beverage, grocery, fashion, home and kitchen, electronics, beauty and mobility and is live in 479 cities with 50 seller participants and 1.79 lakh seller/providers[10], [16]. ONDC has firm plans to expand to fintech services including insurance, credits, investments and gift cards [17]. ONDC is expected to reach 100,000 plus transactions per day for retail and food delivery by January 2024 from 40,000 transactions as of September 2023[18]. ONDC strives to standardize the processes and digitize the whole value chain encouraging inclusion of both sellers and buyers[19]. Its interoperable design allows different platforms to communicate with each other. Unbundling allows multiple network participants including buyer apps, seller apps and logistic players to be part of the network[7]. ONDC participants include network and ecosystem. It is a network-based open protocol that connects buyers and sellers and allows them to transact through a set of open APIs. Customers' awareness of the ONDC platform will help in increasing trust and adoption[20] ONDC has come a long way from its inception. Its mobility sector is undergoing expansion with 'Namma Yatri' app, Kochi Open Mobility Network (KOMN) and Yatri Sathi app in Kolkata[21]. It has formed a partnership with Google cloud for generative AI. ONDC has adopted innovative strategies like corporate gift card to increase awareness, customer engagement and sales during holiday season[22]. ONDC has revised the incentive scheme to include bonuses to network players including B2B sellers and logistic service providers[23]. ONDC has a futuristic vision to move global and provide e-commerce solutions. ONDC has the capability to promote cross-border trade and accelerate and democratize digital commerce across global markets [16].

D. Benefits of ONDC

ONDC is reimagining the e-commerce landscape with the following benefits.

- Enables sellers to sell on every platform at reduced cost
- Inclusive for all buyers and sellers including small retailers preventing dominance of large platforms
- Amplifies hyperlocal players and goods by prioritization for local businesses and sellers [16]
- Safe and transparent environment with fair competition and equal opportunities for sellers and consumers[24]
- Beneficial for supply chain participants (logistics and inventory management) [12]
- Improved digitalization of B2B commerce
- Potential to reach a large audience
- Equitable and fair treatment for all stakeholders
- Build economies of scale [25]

E. Seller Network Participants on ONDC

Seller network participant connects sellers to ONDC using a seller app. These applications interact with the sellers, i.e. the supply side of any transaction. These can be any applications that receive buyer requests and, in response, publish their catalog of goods and services and fulfil buyer orders[26]. ONDC has 50 seller applications presently with 1.79 lakh sellers offering one crore plus stock keeping units (SKU)[10].

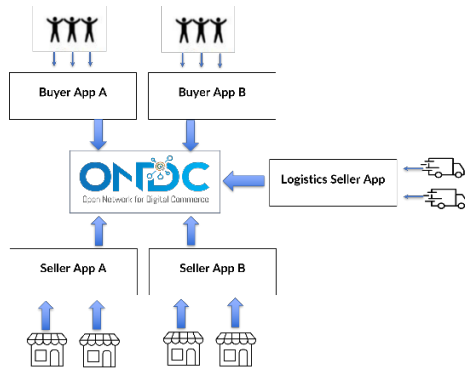


Fig 2: Buyer Seller Logistic Network

Source: ONDC Briefing Presentation

ONDC provides sellers options to expand their businesses with access to more buyers, higher discoverability of products/services at low cost and wider value chain services. Sellers also have autonomy and a portable network-wide reputation. Sellers are categorized as two types, marketplace seller node (MSN) and inventory seller node. MSNs are usually aggregators who do not hold their own inventory but enable and allow sellers to do the transactions. [7].

F. Seller Challenges in ONDC

A challenge is a situation that represents an incentive and an obstacle to overcome. It requires the development and application of diverse and multidisciplinary knowledge to be solved. The need to overcome challenge triggers the generation and application of new knowledge along with necessary tools or resources [27] Seller network participants face multiple challenges as ONDC is a new concept and evolving. Based on the literature review, the below key challenges are identified for further study and analysis. This study deals with MSN-type sellers who play a pivotal role in the overall network.

TABLE 1 - MARKETPLACE SELLER CHALLENGES

MSN Challenges			
Factors	Sub-Factors	Description	Reference
Seller related	Seller acquisition issues	The Indian retail landscape has 12 million plus Kirana stores and MSMEs that are not digitally enabled. They lack awareness about the benefits of ONDC adoption. Also large players should be encouraged to join.	[5], [16]
	Seller retention issues	Compared to existing platforms and marketplaces, switching is easier in ONDC. Ratings and reviews are portable across the network (Portable network-wide reputation) and are not platform-dependent.	[13]
	Competition from existing giants	Existing retail giants have established marketplace platforms and applications. They have robust infrastructure, huge investments in R&D and well-defined processes backed by technology and offer aggressive discounts and promotions.	[28]
	Trust and security issues	- ONDC needs to win the trust of sellers regarding defined systems and processes especially as it is open and decentralized involving multiple network participants. - Ensuring reliability with strong dispute resolution procedures should be put in place.	[29]
Market place related	Registration & Onboarding	- ONDC is highly inclusive and is open for SMEs, startups, retailers and farmers to expand their customer reach across India. - Lack of knowledge of e-commerce, digital understanding and language barriers can impact onboarding time and effort.	[30]
	Seller Catalog management	MSMEs lack digital catalogs and accurate inventory details. Incomplete product listing, low-quality images and lack of relevant keywords can make catalog management cumbersome.	[5]
	Dispatch, review & returns management	- Sellers may lack accountability in doing timely dispatch, providing updates and handling returns. - Framework to curb fake reviews should be defined. Supply chain issues should get resolved on time. Robust and clear issue and grievance management is a needed.	[5], [13]
	Payments management	There exists scope for the integration of innovative payment mechanisms with ONDC. Linking digital payments in offline mode for supply-chain related should be explored	[31]
	Increasing Reach	ONDC is highly inclusive and is open for SMEs, startups, retailers and farmers to expand their customer reach across India. Lack of knowledge of e-commerce, digital understanding and language barriers can impact onboarding time and effort.	[5]
ONDC related	Technology issues	Technology should be up to date and match the technological viability of that of established competitors. It should be robust to	[19]

MSN Challenges			
Factors	Sub-Factors	Description	Reference
		overcome cyber security and online fraud.	
	Operational issues	All integrations like UPI, Digital linking and interaction with buyer apps should work seamlessly. Regular update of inventory should be ensured. Ensuring quality, reliability and limiting counterfeits are needed for building trust	[19]
	Overall Cost of Adoption	Lack of clarity on network monetization between participants is a challenge. Also the ownership of cost of refunds is a challenge considering the disaggregated responsibility.	[5]
	Policies and Grievance Management	Policies, grievance redressal process and online dispute resolution (ODR) are evolving. As tickets may involve buyer and seller apps, ways to reduce overall turnaround time have to be implemented.	[13]
	Scalability	ONDC needs to ensure it has adequate funding and resources for ongoing development and maintenance of the network infrastructure and operations. Also, the network should be scalable to handle the increasing volume and variety of transactions and data.	[14]
	Perceived regulatory/bureaucratic hurdles	ONDC is built on interoperability, open protocols and unbundling. This creates multiple handovers, disaggregated responsibility and potential friction. Issue and grievance management should get updated and made strong. Value propositions and regulations should appeal to all stakeholders of the network.	[32]

III. RESEARCH METHODOLOGY

A. AHP and Fuzzy AHP Approach

Analytic Hierarchy Process (AHP) is a popular, powerful and flexible multi-criteria decision-making (MCDM) tool that ranks the alternatives and identifies the best one. Saaty in 1980 proposed AHP as a tool to solve unstructured problems in economics, social sciences and management. It structures complex problems into a simple hierarchical structure to evaluate associated qualitative and quantitative factors[33], [34]. But it is difficult to precisely assess decision data in real-world problems. This uncertainty impacts the ranking of alternatives as well as the consistency of preferences. Fuzzy AHP (FAHP) was formulated as an extension of classical AHP giving consideration to the fuzziness and vagueness of the decision makers. It is an advancement over traditional AHP[34] FAHP is considered more efficient as fuzzy sets mitigate the uncertainty of nonexpert evaluations[35] In FAHP, crisp numerical values are replaced with Triangular fuzzy numbers (TFN). TFN is represented as $\tilde{A} = (l, m, n)$ where l, m, n represent lower, medium and upper values of A . The main operations of fuzzy numbers used in FAHP calculations are

$$\tilde{A} \oplus \tilde{B} = (l_1 + l_2, m_1 + m_2, n_1 + n_2) \quad (1)$$

$$\tilde{A} \otimes \tilde{B} = (l_1 * l_2, m_1 * m_2, n_1 * n_2) \quad (2)$$

$$\tilde{A}^{-1} = (l, m, n)^{-1} = (1/n, 1/m, 1/l) \quad (3)$$

B. Fuzzy AHP Step-by-Step Procedure

The main steps of the FAHP method followed for the study are mentioned in the section below.

- Step 1 – Design and create the hierarchy tree. The tree with three identified factors and fifteen sub-factors as given in Figure 2 is developed using factors identified from the literature review and expert opinion.

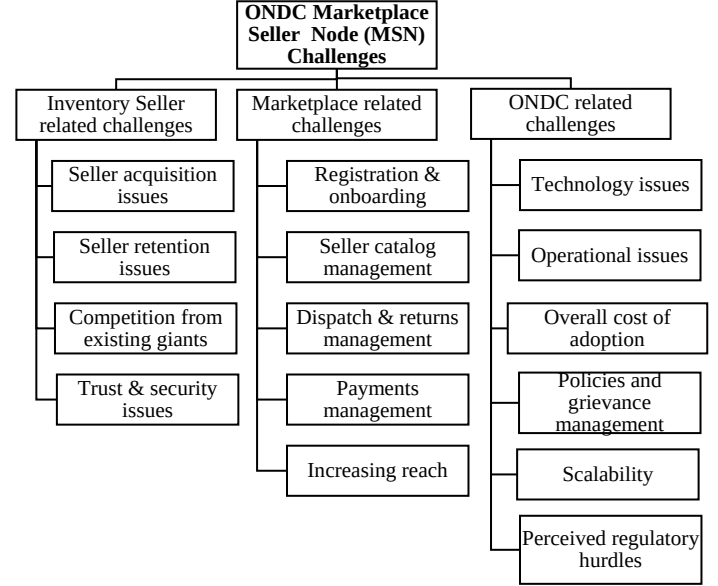


Fig. 2. Hierarchy Tree of Seller Challenges in ONDC

Source : Author

- Step 2 – Collection of Pairwise comparison responses from experts (sellers) following the Delphi Technique. Saaty's scale of relative importance (1 to 9) is used for data collection[36]. The responses were collected from selected ONDC seller network participants including Kiko Live, EkSecond, Bitsila and Bamboology Trends.
- Step 3 – Perform a consistency check using consistency ratios through the eigenvalue method. If $CR < 0.10$, the matrix is considered consistent and acceptable.
- Step 4 – Create a fuzzified pairwise comparison using fuzzy scale of relative importance as given in Table 2.

TABLE 2: THE SCALE OF FUZZY AHP PAIR-WISE COMPARISON

Fuzzy scale of relative importance	TFN	Reciprocal
Equally important	1 1 1	1, 1, 1
Intermediate value between 1 and 3	1 2 3	1/3, 1/2, 1
Slightly important	2 3 4	1/4, 1/3, 1/2
Intermediate value between 3 and 5	3 4 5	1/5, 1/4, 1/3
Important	4 5 6	1/6, 1/5, 1/4
Intermediate value between 5 and 7	5 6 7	1/7, 1/6, 1/5
Strongly important	6 7 8	1/8, 1/7, 1/6
Intermediate value between 7 and 9	7 8 9	1/9, 1/8, 1/7
Extremely important	9 9 9	1/9, 1/9, 1/9

Source: Secondary data (Kaganski et al., 2018)

- Step 5 – Aggregate all expert opinions to a single fuzzy set using geometric mean. Calculate the fuzzy geometric mean and fuzzy weights[38]. Defuzzify the fuzzy

weights and calculate normalized weights for comparison.

- Step 6 – Calculate the global weights of sub-factors based on the main /challenges weights and normalized weights of sub-challenges.

IV. DATA ANALYSIS

Ranking of the supplier challenges in ONDC using FAHP is performed following the step-by-step methodology mentioned in section III.

A. Calculation of Weights - Marketplace Seller Challenges

- Step 1 – Creation of pair-wise comparison matrices from the collected expert responses. Perform aggregation of responses using the geometric mean method.
- Step 2 – Check the consistency ratio. CR should be less than 0.1.

TABLE 3: ONDC MARKETPLACE SELLER CHALLENGES

Comparison Matrix of Marketplace Seller Challenges			
Criterion	Seller	Marketplace	ONDC
Inventory Seller	1.00	3.46	0.82
Marketplace	0.29	1.00	0.45
ONDC	1.22	2.24	1.00
*Consistency Ratio (CR) - 0.0395			

Source: Author

- Step 3 – Create the fuzzified pair-wise comparison table

TABLE 4: ONDC MARKETPLACE SELLER CHALLENGES (FUZZIFIED)

Fuzzified Comparison Matrix of ONDC Seller Challenges									
Criterion	Seller			Marketplace			ONDC		
Seller	1	1	1	1.7	2	2.2	0.2	0.3	0.5
Marketplace	0.4	0.5	0.6	1	1	1	0.2	0.3	0.5
ONDC	2	3	4	2	3.2	4.2	1	1	1

Source: Author

- Step 4 – Calculate the fuzzy geometric mean values

TABLE 4: FUZZY GEOMETRIC MEAN OF MSN CHALLENGES

Fuzzy Geometric Mean Values			
Seller	0.76	0.87	1.04
Marketplace	0.47	0.54	0.66
ONDC	1.59	2.12	2.57
Total	2.82	3.53	4.27
Inverse	0.36	0.28	0.23
Increasing order	0.23	0.28	0.36

Source: Author

- Step 5 – Calculate the final weights.
 - Calculate fuzzy weights
 - Perform defuzzification of fuzzy weights
 - Perform normalization to identify the final weights

TABLE 5: CALCULATION OF WEIGHTS OF MSN CHALLENGES

Criterion	Fuzzy weights			Weights	Normalized Weights
Seller	0.18	0.25	0.37	0.26	0.25
Marketplace	0.11	0.15	0.23	0.17	0.16
ONDC	0.37	0.60	0.91	0.63	0.59
Total				1.06	1.00

Source: Author

B. Calculation of weights of the sub factor challenges

The steps 1 to 5 mentioned above are followed for calculation of fuzzy weights and normalized weights of sub factors.

TABLE 6: CALCULATION OF WEIGHTS OF MSN SUB CHALLENGES

Sub challenge 1 - Seller Related					
Criterion	Fuzzy weights			Weights	Normalized Weights
Seller acquisition	0.21	0.32	0.48	0.34	0.32
Seller retention	0.11	0.15	0.25	0.17	0.16
Competition	0.19	0.28	0.41	0.29	0.28
Trust & security	0.17	0.25	0.36	0.26	0.25
Total				1.05	1.00
Sub challenge 2 - Marketplace Related					
Criterion	Fuzzy weights			Weights	Normalized Weights
Registration & Onboarding	0.12	0.15	0.17	0.15	0.14
Seller Catalog	0.21	0.23	0.25	0.23	0.23
Dispatch & Returns	0.18	0.23	0.25	0.22	0.22
Payments	0.18	0.20	0.27	0.22	0.22
Increasing Reach	0.18	0.20	0.21	0.20	0.20
Total				1.006	1.00
Sub challenge 3 - ONDC Related					
Criterion	Fuzzy weights			Weights	Normalized Weights
Technology issues	0.33	0.58	0.95	0.62	0.37
Operational issues	0.15	0.31	0.56	0.34	0.20
Overall Cost of Adoption	0.12	0.19	0.32	0.21	0.13
Policies and Grievance management	0.10	0.15	0.25	0.17	0.10
Scalability	0.12	0.17	0.27	0.19	0.11
Perceived regulatory hurdles	0.12	0.17	0.22	0.17	0.10
Total				1.7	1.00

Source: Author

C. Summary of main challenges and sub- challenges

TABLE 6: SUMMARY OF CHALLENGES AND SUB-CHALLENGES WEIGHTS

Main Challenges	Weights	Sub-Challenges	Local Weights
Seller related	0.25	Seller Acquisition	0.32
		Seller retention	0.16
		Competition from giants	0.28
		Trust & Security	0.25
Marketplace related	0.16	Registration & Onboarding	0.144
		Seller Catalog management	0.225
		Dispatch & Returns	0.218
		Payments management	0.216
		Increasing Reach	0.196
ONDC related	0.59	Technology issues	0.366
		Operational issues	0.199
		Overall Cost of Adoption	0.125
		Policies and Grievance management	0.099
		Scalability	0.111
		Perceived regulatory/ bureaucratic hurdles	0.101

Source: Author

D. Ranking of ONDC Seller Challenges

The global weights of the main seller challenges are same as their local weights. Global weights of the sub-factors are calculated by multiplying the local weight of the sub-challenges by the weight of the main challenge.

TABLE 7: RANKING OF ONDC SELLER CHALLENGES

Sub-Challenges	Weights	Rank
ONDC related	0.59	1
Seller related	0.25	2
Marketplace related	0.16	3

Sub-Challenges	Global Weights	Rank
Technology issues	0.32	1
Operational issues	0.16	2
Seller Acquisition	0.28	3
Overall Cost of Adoption	0.25	4
competition from giants	0.144	5
Scalability	0.225	6
Trust & Security	0.218	7
Perceived regulatory/ bureaucratic hurdles	0.216	8
Policies and Grievance management	0.196	9
Seller retention	0.366	10
Seller Catalog management	0.199	11
Dispatch & Returns management	0.125	12
Payments management	0.099	13
Increasing Reach	0.111	14
Registration & Onboarding	0.101	15

Source: Author

V. FINDINGS

The study identified and ranked the main challenges faced by marketplace seller nodes (MSN) in ONDC adoption. MSNs have ranked ONDC related challenges as the major challenge compared to that from sellers and marketplaces. The study ranked technological challenges as the major sub challenge followed by operation challenges and customer acquisition challenges. ONDC is technology-led initiative that is currently in beta phase of implementation. It is a much more complex initiative than the existing platform-centric models of e-commerce and UPI [39]. The foundation principles of unbundling involve interaction of multiple players for the completion of single transaction. Glitches identified with respect to technology and operations should be resolved on priority to win the trust of participants. Lack of awareness of ONDC among sellers especially grass root level entrepreneurs and ensuring multilingual content in regional languages will increase the ONDC adoption. Ensuring scalability with respect to technology and operational capability of sellers should be ensured when it goes live across India. Legal and accountability is a grey area though the government has proposed seller apps to take responsibility for resolving customer grievances [40]. The MSN respondents appreciated the progress ONDC has made since its first rollout and expressed optimism regarding the future of ONDC.

VI. CONCLUSION

India's digital transformation journey has gained faster momentum in the last decade accelerating the overall growth of the nation. India's flagship programs 'Digital India' and 'India Stack' along with digital infrastructure and literacy initiatives have made tremendous progress in the development of robust digital public infrastructure and reduction of the digital divide. India's e-commerce industry is growing fast and is expected to reach 350 billion dollars by 2030 in terms of global merchandise value[5]. But the majority of Indian retail players including MSMEs are unable to reap the benefits of this opportunity. COVID-19 further exposed the critical shortcomings of India's e-commerce landscape. The Government of India initiated ONDC to democratize e-commerce in India with the use of open network principles of unbundling and interoperability making it accessible, inclusive and cost-effective for all its players. This removes monopoly, driving fair competition on a level playing field. But there are quite a number of challenges ONDC needs to overcome to reach its full potential. This study focused on the seller network participants and the challenges limiting their adoption of ONDC network using Fuzzy AHP. Overcoming the technical and operational challenges with improved awareness, clear accountability and governance guidelines can increase the overall acceptance of this digital commerce framework by its users. Next few years are extremely crucial for ONDC. It should prove its capability to scale and enable all aspiring sellers who want to embrace e-commerce as a sales channel in the Indian market. In the long run, ONDC should foster a larger and inclusive digital commerce ecosystem becoming another example for the world similar to the UPI program.

VII. MANAGERIAL IMPLICATION

ONDC leadership and seller participant management should closely work to resolve the technological and operational challenges. More campaigns, road shows and expert talks should be launched across India to improve overall awareness and adoption. Scalability, data privacy and security of the network needs high attention.

VIII. FUTURE SCOPE OF STUDY

ONDC is in its second year of inception and in the beta testing phase. It offers tremendous opportunities for future study on challenges of buyer adoption and technology service providers to bring efficiencies and increased adoption.

REFERENCES

- [1] Statista, "Countries with the largest digital populations in the world as of January 2023," Statista.
- [2] G. of I. Ministry of Electronics and IT, "Digital India." Accessed: Sep. 04, 2023. [Online]. Available: <https://csc.gov.in/digitalIndia>
- [3] R. K. Kollinal, "Digital India-The Great Dream," *International Journal of Computer Engineering and Technology (IJCET)*, vol. 10, no. 3, pp. 87–93, 2019, [Online]. Available: <http://www.iaeme.com/IJCET/index.asp87http://www.iaeme.com/ijcet/issues.asp?JType=IJCET&VType=10&IType=3JournalImpactFactor>
- [4] C. Alonso, T. Bhojwani, E. Hanedar, D. Prihardini, G. Una, and K. Zhabaska, "Stacking up the Benefits: Lessons from India's Digital Journey, WP/23/78, March 2023," 2023. [Online]. Available: <https://ssrn.com/abstract=4423373>
- [5] India Brand Equity Foundation, "ONDC to present opportunities to India's local retailers," IBEF. Accessed: Sep. 25, 2023.

- [Online]. Available: <https://www.ibef.org/blogs/ondc-to-present-opportunities-to-india-s-local-retailers>
- [6] S. Yadav, "E-Commerce: The Rise and Rise of E-Commerce in India," 2016.
- [7] ONDC Team, "ONDC - The Way Ahead," 2022.
- [8] N. V. Suresh, "A State-of-the-Art on E-Commerce Business Growth and Application within India," *Splint International Journal of Professionals*, vol. 9, no. 4, pp. 247–250, 2022, doi: 10.5958/2583-3561.2022.00028.5.
- [9] G. Thornton, "Sector flash: E-commerce market in India," 2021.
- [10] ONDC, "ONDC." Accessed: Sep. 09, 2023. [Online]. Available: <https://ondc.org/>
- [11] Press Trust of India, "Regulatory authority in e-commerce needed for protecting small players, says CAIT," *The Economic Times*, Aug. 2023. Accessed: Sep. 21, 2023. [Online]. Available: <https://economictimes.indiatimes.com/industry/services/retail/regulatory-authority-in-e-commerce-needed-for-protecting-small-players-says-cait/articleshow/102954988.cms?from=mdr>
- [12] MSME Desk, "ONDC was born to help small businesses under threat from e-commerce challenges: Piyush Goyal," *Financial Express*, Apr. 26, 2023. Accessed: Sep. 21, 2023. [Online]. Available: <https://www.financialexpress.com/industry/sme/msme-eodb-ondc-was-born-to-help-small-businesses-under-threat-from-e-commerce-challenges-piyush-goyal/3063619/>
- [13] S. Mathi, "ONDC Explained: How Commissions, Search Rankings, Grievance Redressal, And Ratings Will Work," Medianama. Accessed: Sep. 25, 2023. [Online]. Available: <https://www.medianama.com/2022/09/223-ondc-commissions-grievances-search-rankings-ratings/>
- [14] J. Dash, "ONDC can build sovereignty in India's digital revolution," Times of India. Accessed: Sep. 25, 2023. [Online]. Available: <https://timesofindia.indiatimes.com/readersblog/blogger-park/ondc-can-build-sovereignty-in-indias-digital-revolution-54042/>
- [15] M. Parvin, S. Bin Asimiran, and A. F. B. M. Ayub, "Impact of introducing e-commerce on small and medium enterprises – a case on logistics provider," *Society and Business Review*, vol. 17, no. 3, pp. 469–484, Jul. 2022, doi: 10.1108/SBR-10-2020-0131.
- [16] McKinsey, "Democratizing Digital Commerce In India," 2023.
- [17] A. Kumar and S. Shinde, "ONDC to open its platform for fintech services like credit, insurance," Business Standard. Accessed: Oct. 05, 2023. [Online]. Available: https://www.business-standard.com/companies/news/open-network-for-digital-commerce-to-open-its-platform-for-fintech-services-123092701138_1.html
- [18] B. Krishna, "ONDC Set To Challenge E-Commerce Giants; Daily Transactions Could Rise To 100,000 From Next Year," Swarajya. Accessed: Oct. 05, 2023. [Online]. Available: <https://swarajyamag.com/business/ondc-set-to-challenge-e-commerce-giants-daily-transactions-could-rise-to-100000-from-next-year>
- [19] B. Dash, P. Sharma, M. F. Ansari, and S. Swayamsiddha, "A review of ONDC's digital warfare in India taking on the e-commerce giants," 2022. [Online]. Available: <https://ssrn.com/abstract=4323963>
- [20] Dr. A. Walia, "Predicting Consumer Acceptance of the Proposed Open Network for Digital Commerce," 2023.
- [21] M. Agarwal, "ONDC Prepares For Full Launch Of Cab Services In Kolkata As Pilot Crosses 250K Rides," Inc42. Accessed: Sep. 27, 2023. [Online]. Available: <https://inc42.com/buzz/ondc-prepares-for-full-launch-of-cab-services-in-kolkata-as-pilot-crosses-250k-rides/>
- [22] S. Mitra, "ONDC Launches Corporate Gift Card To Boost Sales On Platform During The Festive Season," inc42.
- [23] D. Choudhury, "ONDC introduces bonuses of up to Rs 35 lakh per week for buyer-side apps ahead of festive season," Money Control. Accessed: Oct. 05, 2023. [Online]. Available: <https://www.moneycontrol.com/news/business/startup/ondc-introduces-bonuses-of-up-to-rs-35-lakh-per-week-for-buyer-side-apps-ahead-of-festive-season-11468131.html>
- [24] R. Singh, "How to Create an ONDC Marketplace," Webkul. Accessed: Oct. 05, 2023. [Online]. Available: <https://webkul.com/blog/how-to-create-an-ondc-marketplace/>
- [25] ET Retail, "ONDC to foster hyperlocal ecommerce business model in India: Nandan Nilekani Read more at: <https://retail.economictimes.indiatimes.com/news/e-commerce/e-tailing/ondc-to-foster-hyperlocal-ecommerce-business-model-in-india-nandan-nilekani/99254185>," The Economic Times. Accessed: Sep. 21, 2023. [Online]. Available: <https://retail.economictimes.indiatimes.com/news/e-commerce/e-tailing/ondc-to-foster-hyperlocal-ecommerce-business-model-in-india-nandan-nilekani/99254185>
- [26] MyStore, "Mystore Seller App." Accessed: Sep. 29, 2023. [Online]. Available: <https://seller.mystore.in/en/>
- [27] A. van den Beemt *et al.*, "Taking the Challenge: An Exploratory Study of the Challenge-Based Learning Context in Higher Education Institutions across Three Different Continents," *Educ Sci (Basel)*, vol. 13, no. 3, Mar. 2023, doi: 10.3390/educsci13030234.
- [28] A. S. George and A. S. Hovan George, "Open Network for Digital Commerce (ONDC): Democratizing Digital Commerce and curbing digital monopolies in India," *Partners Universal International Research Journal*, 2022, doi: 10.5281/zenodo.6799694.
- [29] ONDC team, "Building Trust in the ONDC Network - Consultation Paper," 2022.
- [30] Mystore, "5 Tips to get the most from your ONDC Network seller app," Mystore blogs. Accessed: Sep. 25, 2023. [Online]. Available: <https://www.mystore.in/en/blog/5-tips-to-get-the-most-from-your-ondc-network-seller-app>
- [31] A. B. M. Bhargava, "ONDC: integrating payments systems crucial to re-imagining digital commerce in India," Phoenix Legal . Accessed: Sep. 25, 2023. [Online]. Available: <https://www.lexology.com/commentary/banking-financial-services/india/phoenix-legal/ondc-integrating-payments-systems-crucial-to-re-imagining-digital-commerce-in-india>
- [32] R. Gupta, "Regulation could help ONDC counter an e-com duopoly," Mint. Accessed: Sep. 26, 2023. [Online]. Available: <https://www.livemint.com/opinion/online-views/regulation-could-help-ondc-counter-an-e-com-duopoly-11667838646597.html>
- [33] A. Darko, A. P. C. Chan, E. E. Ameyaw, E. K. Owusu, E. Pärn, and D. J. Edwards, "Review of application of analytic hierarchy process (AHP) in construction," *International Journal of Construction Management*, vol. 19, no. 5, pp. 436–452, Sep. 2019, doi: 10.1080/15623599.2018.1452098.
- [34] A. Özdağoğlu and G. Özdağoğlu, "Comparison of AHP And Fuzzy AHP For the Multi-Criteria Decision Making Processes with Linguistic Evaluations," *Istanbul Ticaret Üniversitesi Fen Bilimleri Dergisi*, pp. 65–85, 2007.
- [35] S. Moslem *et al.*, "An Integrated Fuzzy Analytic Hierarchy Process (AHP) Model for Studying Significant Factors Associated with Frequent Lane Changing," *Entropy*, vol. 24, no. 3, Mar. 2022, doi: 10.3390/e24030367.
- [36] T. L. Saaty and Y. Wind, "MARKETING APPLICATIONS OF THE ANALYTIC HIERARCHY PROCESS," *Manage Sci*, vol. 26, no. 7, p. 641, 1980.
- [37] S. Kaganski, J. Majak, and K. Karjust, "Fuzzy AHP as a tool for prioritization of key performance indicators," in *Procedia CIRP*, Elsevier B.V., 2018, pp. 1227–1232. doi: 10.1016/j.procir.2018.03.097.
- [38] J. J. Buckley, "FUZZY HIERARCHICAL ANALYSIS*," 1985.
- [39] Livemint, "What is Open Network for Digital Commerce (ONDC)? Benefits and Challenges Explained," Mint. Accessed: Oct. 06, 2023. [Online]. Available: <https://www.livemint.com/companies/news/open-network-for-digital-commerce-ondc-is-complex-to-implement-unlike-upi-jefferies-report-11660633272655.html>
- [40] M. Agarwal and L. Mundhra, "How India's Ambitious ONDC Project Can Reinvent Indian Ecommerce," inc42. Accessed: Oct. 06, 2023. [Online]. Available: <https://inc42.com/features/explainer-how-indias-ambitious-ondc-project-can-reinvent-indian-ecommerce/>