

Financial Technology as a Basis for Financial Inclusion and its Impact on Profitability: Evidence from Commercial Banks

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Abstract

The purpose of this study was to show how financial technology tools can be used to reinforce financial inclusion indicators on the profitability indicators of a Jordanian commercial bank listed on the Amman stock exchange. Between 2010 and 2020, a quantitative and qualitative panel data set was used. The study population is represented by all the banks listed on the Amman stock exchange (n = 16). The study found that financial technology through its multitools changed the structure of the overall financial services, besides the diversity and style of financial services for the commercial banks' clients, thus reinforcing and increasing the availability for a wider social group that did not have access to that service. Further, it was found that there is a significant effect of the financial technology tools to reinforce the financial inclusion indicators over the studies' profitability indicators that include return on assets, return on equity, and earnings per share (JD). It is recommended to adopt effective and modern financial and technological strategies that provide marginalized social groups and small and medium enterprises reasonable access to the financial services and products that meet their needs, including transactions, payments, savings, credit, and insurance. Thus, getting the added value of the data and investing it to increase the financial inclusion indicators improves the profitability indicators and income for commercial banks.

Keywords: *Financial Technology, Profitability, Financial Inclusion, Commercial Banks.*

1 Introduction

Financial technology (FT) refers to any business that uses technology to enhance or automate financial services and processes. The term refers to a broad and rapidly growing industry serving both consumers and businesses. FT represents digitizing and modeling data in order to become the primary source of income and have economic value (Leong et al., 2018).

The FT includes all the technological innovations in the financial sector. as the one that updates the financial services of clients and their investments. In this light and based on the well-developed financial sector over the last few decades, it forms a great place for innovations in the FT field (Kim et al., 2015. (Musa et al., 2019). For example, the successful adaptation of the e-Fawateercom platform by the Central Bank of Jordan indicates the importance of using innovative and technological tools in the financial sector effectively (Al-Dmour, 2017).

Using FT tools was raised after the world financial crisis in 2008 to upgrade the traditional financial sector (Linda, 2017). In Jordan, many companies have specialized in developing financial technology tools. For example, MadfoatCom and Green Wallet have effectively created innovative financial solution tools that increase the prevalence of online financial services (Ayoush & Rabayah, 2020).

This study aimed to explore the effect of financial technology in enforcing the financial inclusion indicators based on the Jordan financial sector. Further, explore the impact of digital financial inclusion on the profitability indicators among Jordanian commercial banks listed on the Amman Stock Exchange (ASE).

2 Study Problem

The Arab countries are still recording low levels of financial inclusion in the world. It was reported that only about a third of the adults (37%, n = 160) in the Arab countries have a bank account, which means about two-thirds (63%) have been excluded from the funding and governmental financial services. On the other hand, in 2017, the percentage of people having a bank account was relatively high in Arab United Emarat, Bahrain, and Kuwait (82%, 83%, and 80%, respectively). This percentage was limited to 25% among Yemen, Sudan, Mauritania, Iraq, and Syria (Demirguc et al., 2017).

Financial inclusion means that individuals and businesses can access useful and affordable financial services delivered responsibly and sustainably. And adapting to it has become an important program locally and internationally. Previous research on financial inclusion found that more than half of adults (59%) in the wild world lacked access to credit, insurance, and savings tools (WAMDA, 2016).

Only 10% of Jordanians with a bank account have access to the tools needed to manage their lending sources (Demirguc & et al., 2017).

In the last few years, FT has become a revolution in the financial systems in Arab countries and the world as its fast and affordable price competes with traditional financial services (Sadakowski & Sobieraj, 2017). Further, recent studies consider FT one of the most important tools to merge individuals and corporations under the financial inclusion umbrella. Thus, offering official financial services to all the social classes meets their needs (Kim et al., 2015). Offering accessible and affordable FT tools to all community members will have a positive impact on social welfare and financial inclusion (Mustafa & et al., 2020). From the above, the study problem can be summarized by asking the following questions: Is there an impact of improving financial inclusion indicators by using FT tools on profitability indicators in commercial banks listed on the Amman Stock Exchange?

3 Literature review

Several studies were carried out to examine the impact of financial inclusion on several corporate aspects. Chauvet and Jacolin (2017) studied the impact of financial inclusion and bank concentration on the performance of firms in developing and emerging countries. The results showed that financial inclusion, measured as the distribution of financial services across firms, has a positive impact on firm growth. In another study, Grohmann et al. (2018) explain that financial literacy has an impact on improving financial inclusion.

The AFI (2019) indicated three dimensions of financial inclusion:

- Access, which is the ability to use the services and products offered by formal financial institutions,
- Usage, which is the depth or extent of financial services and products used,
- Quality, which is a dimension that evaluates how financial services fulfil the needs of their users from different angles, including affordability, convenience, fair treatment, choice and other aspects related to consumer protection, financial education and other areas.

The importance of financial technology and financial inclusion:

Financial inclusion is an effective tool of high priority that aids countries' social, economic, and strategic development. The importance of financial inclusion is manifested in three main aspects:

1. Social aspect: Reinforcing financial inclusion helps reduce poverty and financial exclusion and raises awareness among people about effectively using their savings (Bijendra & Ananya, 2018).
2. Several studies concluded that there was an established relationship between financial inclusion, financial stability, and economic growth. Increased financial services and financing of small and medium-sized enterprises contribute to increasing bank deposits, which supports economic growth and

helps achieve financial stability (Azka & Sahara, 2018; Kabiraj & Siddik 2018).

3. The financial supervisory authorities are working to strengthen the integrated financial inclusion framework as a strategic goal, furthering alignment with the other strategic goals, including financial stability, financial integrity, and consumer protection (Al-Chahadah et al., 2020).

Several studies have supported the importance of FT, especially in the banking sector, through the following: (Xiang et al., 2014; Cheng et al., 2017; Al Chahadah et al., 2018)

1. FT covers a wide range of financial services, including crowdfunding, payment over telephone solutions, international money transfers, and e-wallet management tools, which are not provided by traditional banking.
2. FT changes the overall financial services structure and provides banking services to the clients, making them faster, cheaper, safer, and more accessible.
3. FT helps banks reach more clients by overcoming geographical and physical limitations and facilitating access to banking services.
4. FT plays a critical role in expanding banking operations and increasing access to financial inclusion services for a wide range of traditionally underserved marginalized groups.

Financial inclusion is defined as the availability and equality of opportunities to access financial services. There is increasing interest in its ability to contribute to economic and financial development and promote growth and income. The World Bank considers financial inclusion a key enabler to reducing extreme poverty and boosting shared prosperity (WAMDA, 2016). Also, financial inclusion is considered one of the most important lessons learned after the global financial crisis due to its important role in maintaining financial stability (Morgan & Pontines, 2014), which allowed it to become a priority in international policy strategies (Cihak, Mare et al., 2016). Many studies expect an increased adaption of financial inclusion by many countries (Mwongeli, 2018).

FT startups have succeeded in providing a variety of financial services, including online payments and money transfers, as well as lending, crowdfunding, and savings management, in addition to insurance services. Further, the high demand for these services casts a shadow over the future of traditional financial services, especially in light of the rapid development of innovative and technological solutions that provide many affordable digital financial services. (Shehata, 2019).

Nowadays, FT is considered one of the most important tools for community transformation to integrate individuals and institutions within the umbrella of financial inclusion (Yao et al., 2018). FT offers financial services to all social individuals and institutions through official channels, including bank accounts, online payment and transfer services, insurance, finance and credit, and other innovative financial services at competitive prices. Further, FT permits avoiding using informal channels that are not subject to supervision (Mustafa et al., 2020).

Recently, the importance of FT awareness has been increased, and it was found that 94% of consumers used at least one FT tool, which was online money transfer, and 75% of them used FT services for online payment. However, the global average percentage adoption of FT services is 46%. Online money transfers and payments are the most commonly used FT services, as the percentage of consumers (18%) in 2015 increased to 50% in 2017 and to 75% in 2019 (Global Fintech Adoption INDEX, 2019). The following figure shows the order of FT services by adoption rate from 2015 to 2019.

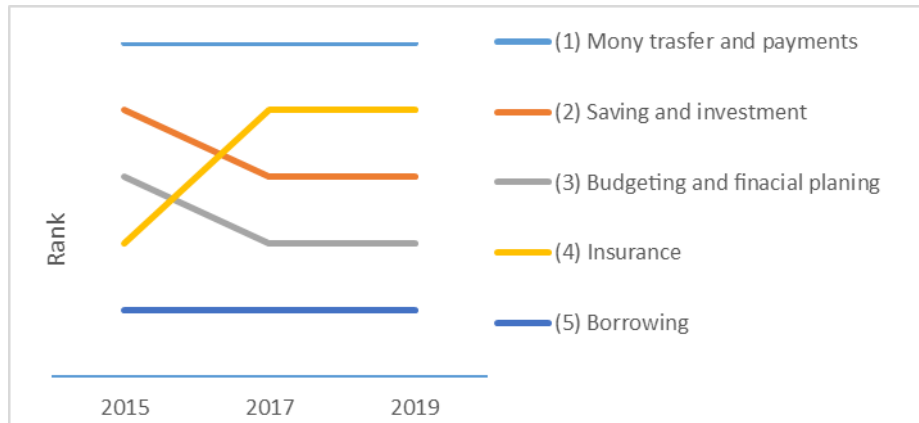


Figure 1 depicts the adoption rate of financial technology items from 2015 to 2019.

In a previous survey that included 12 countries in the Middle East, North Africa, Afghanistan, and Pakistan regions, it was found that the number of startups in FT has increased sevenfold since 2009, with investments focused on Egypt, Jordan, Lebanon, and the United Arab Emirates. These startups have emerged side by side and compete with banks, which also use digital technology to move to more customer-focused business models (WAMDA, 2016).

FT also plays an important role in promoting and facing the critical challenges of financial inclusion, growth, and diversification of economic activity by providing innovative financial services to many clients, especially those who do not deal with the banking system. Furthermore, facilitating the availability of alternative sources of financing to meet the needs of small and medium-sized enterprises (Baber, 2020).

Embracing the importance of using FT by financial firms in general and banks in particular Abbasi & Weigand (2017) and Gonzalez (2018) studied the impact of FT on the diversity of financial services, operational efficiency, financial stability of the bank, and the client's protection ways, the results of which can be summarized by the following points:

1. FT contributed to the diversity of financial services provided to customers and institutions by supporting online and third-party payments, accepting electronic deposits, providing digital credit services, developing online lending platforms, and supporting investment processes through e-commerce operations.

2. FT is enhancing the efficiency of operational processes, particularly by reducing transaction costs, cash management and credit operations.
3. FT is enhancing financial stability by reducing the negative impacts of many risks, including credit, liquidity, and operating risks, as well as reducing operational challenges associated with the banking system's infrastructure, in addition to achieving greater profitability rates.
4. FT affects clients' protection by strengthening security systems, fraud risks, confidentiality protection, and clinical data privacy, and avoiding the risk of unfair exclusion or distinction between clients.

Table (1) shows banking service access methods, including ATMs or branches of Jordanian banks listed in the ASE (2010-2020). It was found that there is an increase in the number of ATMs and branches, which indicates an increase in the volume of operations and clients, besides the financial stability and operational efficiency of these banks. Further, these data indicate the commercial banks' willingness to expand their business to the regions and places of marginalized groups.

Table 1: Total Banking Service Access Points from 2010 to 2020

#	Year	ATMs number	Branches number	Yearly ATMs increasing number %	Yearly Branches increasing number %
1	2010	420	630	8.65	9.45
2	2011	466	706	10.95	12.06
3	2012	542	785	16.31	11.19
4	2013	612	876	12.91	11.59
5	2014	647	958	0.089	0.094
6	2015	705	1132	0.09	18.16
7	2016	765	1241	0.085	0.096
8	2017	810	1389	0.059	11.93
9	2018	846	1487	0.044	0.071
10	2019	929	1630	0.10	0.096
11	2020	1008	1710	0.85	0.049

Table 2: Banking service access points (ATMs, banks, and branches) from 2010 to 2020.

#		ATMs	ATMs share market	Branches	Branch share market
1.	Arab Banking Corporation (Jordan)	59	0.035	29	0.029
2.	The Housing Bank for Trade & Finance	238	0.139	132	0.131
3.	Jordan Kuwait Bank	64	0.037	44	0.044

4.	Invest Bank	34	0.019	17	0.017
5.	Jordan Commercial Bank	75	0.044	36	0.035
6.	Jordan Ahli Bank	59	0.035	50	0.050
7.	Cairo Amman Bank	135	0.079	104	0.103
8.	Bank Of Jordan	122	0.071	93	0.092
9.	Arab Jordan Investment Bank	57	0.033	31	0.031
10.	Societe Generale De Banque (Jordanie)	29	0.017	21	0.021
11.	Jordan Islamic Bank	220	0.129	118	0.116
12.	Safwa Islamic Bank	79	0.047	40	0.040
13.	Islamic International Arab Bank	144	0.084	78	0.077
14.	Arab Bank	257	0.150	145	0.144
15.	Capital Bank Of Jordan Corporate Actions	78	0.046	29	0.029
16.	Bank al Etihad	60	0.035	41	0.041
		1710	%100	1008	%100

Table 2 shows that Arab Bank has the highest branch and ATM numbers ($n = 145$, 14.4% and $n = 257$, 15%, respectively) followed by those for the Housing Bank ($n = 132$, 13.1% and $n = 238$, 13.9, respectively). Also, Invest Bank has the lowest branch number ($n = 17$, 0.017%), and Societe General Bank has the lowest ATM number ($n = 29$, 0.017%). Further, the number of bank service access points is constantly increasing, providing services to the largest segment of clients. As shown in Table 2, there was an increase of 10 branches per year during the period from 2010 to 2019, raising the number of branches and ATMs, indicating an increase in the interest of clients in the use of electronic banking services, especially online banking, besides indicating the necessity for developing the financial inclusion indicators and increasing the number of digital access points to meet the client's needs.

Table 3: Indicators of the use of financial services for banks listed on the ASE

#	Year	Deposits	Credit loans	Total assets	credits-to-deposit ratio	credits-to-asset ratio	Deposit-to-asset ratio
1	2010	30,882,139,663	21,408,367,027	48,477,966,019	69.32	44.16	63.70
2	2011	32,564,590,886	22,020,352,390	50,516,950,642	67.62	43.59	64.46
3	2012	32,985,132,373	22,617,592,951	50,850,261,215	68.57	44.48	64.87
4	2013	32,094,064,857	21,444,088,508	49,754,654,527	66.82	43.10	64.50
5	2014	35,505,052,281	22,929,321,927	52,938,354,453	64.58	43.31	67.07
6	2015	37,519,378,093	24,592,364,772	54,600,231,585	65.55	45.04	68.72
7	2016	36,199,739,061	26,106,818,552	53,468,221,280	72.19	48.83	67.70
8	2017	37,672,169,227	28,562,616,466	55,773,699,747	75.82	51.21	67.54
9	2018	39,072,490,429	29,365,501,431	58,125,593,366	75.16	50.52	67.22
10	2019	40,529,736,041	29,285,041,375	60,446,481,868	72.26	48.45	67.05
11	2020	42,269,845,713	29,882,237,127	62,772,939,664	70.69	47.60	67.34

Table 3 shows that the loans-to-deposits ratios were close to each other during the studied period. The highest loan-to-deposit ratio (75.82%) was in 2017, while the lowest ratio (64.58%) was in 2014. Furthermore, there is a low deviation in the deposits-to-assets ratios; the highest ratio (68.72%) was in 2015, while the lowest ratio (63.70%) was in 2010. Besides, banks' loan-to-asset ratios indicate efficient operating in credit facilities, reaching the highest ratios (51.21%) in 2017, while the lowest ratio (43.10%) was in 2013. Overall, there is a stable proportion of the volume of loans granted by banks to the volume of deposits. Also, there is an acceptable size for banks' deposits to the total assets available in banks.

Table 4: Profitability Indicators (return on assets and return on Equity) for

#	Year	Profitability ratios for Jordanian commercial banks listed on the ASE		
		Return on assets	Return on Equity	Earnings Per Share (JD)
1	2010	0.98	6.63	0.22
2	2011	1.17	8.00	0.26
3	2012	1.24	8.27	0.27
4	2013	1.41	9.49	0.34
5	2014	1.22	8.89	0.29
6	2015	0.97	7.28	0.22
7	2016	0.97	7.28	0.22
8	2017	1.07	7.59	0.23
9	2018	1.36	10.19	0.30
10	2019	1.23	9.26	0.28
11	2020	0.33	2.36	0.07

Jordanian Commercial Banks

Table 4 demonstrates that the profitability indicators of Jordanian commercial banks were close during the studied years. The return on assets ratio in 2013 was the highest (1.41%), and the lowest rate (0.33%) was in 2020. Regarding the return on equity ratio, the highest rate (10.19%) was in 2018, whereas the lowest ratio (2.36%) was in 2020. Regarding the Earnings per Share (JD) ratio, the highest rate (0.34%) was in 2013, whereas the lowest ratio (0.07%) was in 2020, indicating financial and economic stability in the banks' operations and an acceptable return on equity ratio for shareholders and investors.

4 Method

The study is based on the descriptive analytical approach using panel data of Jordanian commercial banks from 2010 until 2019, using the statistical program (SPSS). The data was extracted from the annual report of the Amman Stock Exchange (<https://www.exchange.jo/en>). This study included all the banks listed in ASE (n = 16). The current study explored the impact of financial technology indicators on enhancing financial inclusion in ASE-listed commercial banks by testing two independent variables (Park, & Mercado, 2018):

1. **Availability of financial services:** This variable was assessed by the number of branches and ATMs of Jordanian commercial banks.
2. **Use of financial services:** This variable was assessed by the credit-to-deposits ratio, the deposits-to-assets ratio, and the credit-to-assets ratio of Jordanian commercial banks.

The dependent variable was assessed as follows:

1. **Return on assets:** This variable was measured by equating net profit after tax to the average total assets of Jordanian commercial banks.
2. **Return on Equity:** This variable was measured by equating net profit after tax to the average total equity of Jordanian commercial banks.
3. **Earnings per Share:** This variable was measured by equating net profit after tax to the number of shares subscribed.

Table 5 the studied variables

	Variable	Description
Independent	No. ATMs	Number of active ATMs for the banks
	No. Branches	Number of active branches of the banks
	Deposits-to-assets ratio (%)	The percentage of assets that are being financed with debt
	Credits to deposit ratio (%)	The percentage of debt that is being financed with credit
	Credits to Assets Ratio (%)	The percentage of assets that are being financed with credit
Dependent	Return On Assets (%)	The ratio of the net profit for the last financial year to average assets
	Return On Equity (%)	The ratio of the net profit for the last financial year to average shareholders' Equity
	Earnings per Share%	The ratio of the net profit for the last financial year to the Number of shares subscribed.

The impact of FT tools as a strengthener of financial inclusion indicators to improve the return on assets and return on equity and earnings per share ratios was measured using the following equations (1 and 2, respectively), which consisted of the five independent variables for each bank (i) and during a defined period (t) in addition to the margin of error (E):

$$(1) \ln ROA_{it} = ROA_{it-1} + No.ATMs_{it} + NO. Branches_{it} + Deposits\ to\ assets_{it} + Credits\ to\ deposit_{it} + Credits\ to\ Assets_{it} + E_{it}$$

- (2) $\ln ROE_{it} = ROE_{it-1} + No.ATMs_{it} + NO. Branches_{it} + Deposits\ to\ assets_{it} + Credits\ to\ deposit_{it} + Credits\ to\ Assets_{it} + E_{it}$
- (3) $\ln JD_{it} = JD_{it-1} + No.ATMs_{it} + NO. Branches_{it} + Deposits\ to\ assets_{it} + Credits\ to\ deposit_{it} + Credits\ to\ Assets_{it} + E_{it}$

4 Study hypotheses

The study's hypotheses are as follows:

- HA1:** Financial technology tools have a significant impact as a strengthener of financial inclusion indicators to improve the return on assets ratio in ASE-listed commercial banks.
- HA2:** Financial technology tools have a significant impact as a strengthener of financial inclusion indicators to improve the return on equity ratio in ASE-listed commercial banks.
- HA3:** Financial technology tools have a significant impact as a strengthener of financial inclusion indicators to improve the earnings per share ratio in ASE-listed commercial banks.

Testing hypotheses

Table 6 Multi-regression analysis of the impact of FT tools as a strengthener of the financial inclusion indicators to improve the return on assets ratio

Independent variable	Return on Assets			
	B	Beta	T	Sing
Number of ATMs	-1.041	2.005-	2.484-	0.001**
Number of Branches	-0.004	0.358-	0.631-	0.000**
Deposits to assets	1.035	31.745	0.274	0.009**
Credits to deposits	-0.037	6.276-	3.261-	0.012*
Credits to assets	0.171	13.251	4.245	0.003**
Multiple Correlation Coefficient (MCC)	0.651			
R ²	0.587			
df	(4-11)			
F	7.364			
Sing.	0.014*			

* P-value ≤ 0.05; ** P-value ≤ 0.01

The multiple regression analysis (table 6) showed a significant relationship (P-value ≤ 0.05) between the FT variable and the financial inclusion indicators to improve the return on assets ratio as one of the profitability indicators in the commercial banks. Further, the R² indicated that the independent variables (financial inclusion indicators) accounted for 58.7% of the subordinated variable,

i.e., return on assets ratio, in ASE-listed commercial banks. Thus, the first hypothesis can be accepted where there is a significant impact of financial technology tools as a strengthener of financial inclusion indicators to improve the return on assets ratio.

Table 7 Multi-regression analysis of the impact of FT tools as a strengthener of the financial inclusion indicators to improve the Return on Equity Ratio

Independent variable	Return on Equity Ratio			
	B	Beta	T	Sing
Number of ATMs	-0.031	-0.356	-0.558	0.046*
Number of Branches	0.023	2.564	3.157	0.040*
Deposits to assets	0.432	13.681	1.142	0.042*
Credits to deposits	0.154	4.520	1.587	0.026*
Credits to assets	-0.951	-10.621	-2.741	0.045*
Multiple Correlation Coefficient (MCC)	0.637			
R ²	0.589			
df	(4-11)			
F	10.168			
Sing.	0.011*			

* P-value \leq 0.05; ** P-value \leq 0.01

We have found a significant relationship (Table7) between the FT tools and financial inclusion indicators, thus improving the return on equity ratio and the ability of a firm to generate profits from its shareholders' investments in the bank. The independent variables, i.e., FT indicators, interpreted 58.9% of the dependent variable, i.e., return on equity ratio. Thus, the second hypothesis of research hypotheses can be accepted as a significant impact of the FT tool as a strengthener of financial inclusion indicators to improve the return on equity ratio.

Table 8 Multi-regression analysis of the impact of FT tools as a strengthener of the financial inclusion indicators to improve the Earnings per Share ratio

Independent variable	Earnings per Share ratio			
	B	Beta	T	Sing
Number of ATMs	0.028-	0.426-	0.645-	0.026*
Number of Branches	0.036	1.987	3.140	0.032*
Deposits to assets	0.542	12.897	1.231	0.017*
Credits to deposits	0.135	3.798	1.473	0.021*
Credits to assets	0.874-	11.703-	2.654-	0.023*
Multiple Correlation Coefficient (MCC)	0.486			
R ²	0.352			
df	(4-11)			
F	9.856			
Sing.	0.009*			

* P-value \leq 0.05; ** P-value \leq 0.01

We have found a significant relationship (Table8) between the FT tools and financial inclusion indicators, thus improving the earnings per share ratio and the ability of a firm to generate profits from its shareholders' investments in the bank. The independent variables, i.e., FT indicators, interpreted 35.2% of the dependent variable, i.e., the Earnings per Share ratio. Thus, the three hypotheses can be accepted as a significant impact of the FT tool as a strengthener of financial inclusion indicators to improve the earnings per share ratio.

5 Conclusion

This study aimed to explore the impact of FT tools on strengthening financial inclusion indicators and banks' profitability in light of Jordan's experience. The most important findings of the study are that FT, through its various tools, led to a change in the structure of financial services and the way and method of providing and diversifying banking services, thereby promoting and increasing the availability of financial services for community groups that had no access to traditional financial services.

The study results also showed a significant impact of FT tools on strengthening financial inclusion and profitability indicators, including return on assets, return on equity, and earnings per share ratio, of the Jordanian commercial banks. It is recommended to adopt and employ more advanced and digitalized FT tools to improve financial inclusion indicators further and provide financial services to all marginalized social groups, like online payment, transfer, insurance, financial and credit services, and other innovative financial services at affordable prices. Using effective FT tools will play a role in obtaining added value from the collected financial transaction data, thus increasing the financial inclusion indicators and improving the banks' profitability and income.

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