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Cryptocurrencies and code before the courts

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Case and Comment

Cryptocurrencies and Code Before the Courts

B2C2 Ltd v Quoine Pte Ltd

Vincent Ooi[*] and Soh Kian Peng[**]

In the rapidly developing cyber sphere dominated by cryptocurrencies and code, it is perhaps not uncommon for firms to focus on cutting-edge technological developments leaving the law behind as an afterthought. *B2C2 Ltd v Quoine Pte Ltd* ('B2C2')[1] may serve as a timely reminder of the importance of the legal principles supporting e-commerce and Fintech. In the first case of its kind, *B2C2* raised several key questions before the Singapore International Commercial Court ('SICC'), seeking clarification on how the established legal concepts of breach of trust, mistake and unjust enrichment might apply in the context where an automated contract-forming software had produced unusual results. This decision represents the most comprehensive treatment by a Commonwealth court of the legal nature of cryptocurrencies and automated contract-forming software to date; a harbinger of further and more complex litigation to come, as disputes involving e-commerce and Fintech gradually start to reach the courts.

The defendant, Quoine Pte Ltd ('Quoine'), operated a currency exchange platform ('Platform') enabling third parties to trade cryptocurrencies for fiat currencies or other cryptocurrencies and traded as an electronic market maker on the Platform using its software programme ('Quoine's Quoter Program'). The plaintiff, B2C2 Ltd ('B2C2'),

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[1]   [2019] 4 SLR 17 ('*B2C2*').

was an electronic market maker providing liquidity on the Platform by trading at prices it quoted for cryptocurrency pairs; Bitcoin ('BTC') and Ethereum ('ETH').[2]

Key to this case were certain limitations in Quoine's Quoter Program and the Platform which allowed B2C2's trading software to sell ETH for BTC at 250 times the going rate to certain other users on the Platform ('Counterparties'). An oversight prevented changes from being made to Quoine's Quoter Program, preventing it from accessing external market prices from other exchanges which Quoine used for market making purposes and also to create liquidity. The programme became ineffective and stopped creating ETH/BTC orders on the platform. However, no error message was generated. Quoine was thus unaware of the error.[3] Consequently, this reduced trading on the platform to 'abnormally thin' levels, triggering margin calls on the Counterparties' account resulting in placement of market orders to buy ETH at the best available market price which happened to be that offered by B2C2. Quoine's Platform was also not configured to check if a user's account contained sufficient funds before placing an order. This allowed the Platform to trade more BTC than the Counterparties had in their account and at abnormally high prices. Quoine subsequently reversed these trades on grounds that they were a highly abnormal deviation from the previous going rate.

B2C2 sued Quoine for breach of contract, alleging that they had no right to unilaterally reverse the trades. B2C2 further sued Quoine for breach of trust as it had unilaterally removed BTC from B2C2's account following its reversal of the impugned trades. In its defence, Quoine raised six arguments, submitting that (1) that it was entitled to reverse the trades on grounds of terms implied on the 'Terms and Conditions' stated on Quoine's website ('Agreement'), or (2) express terms in the Agreement read in conjunction with its web-page on 'Risks in Virtual Currency Transactions' ('Risk Disclosure Statement'), and that (3) the contracts were void or voidable under the doctrines of unilateral mistake at common law or (4) equity and (5) mutual mistake or, or (6) unjust enrichment.

IMPLIED TERMS

Quoine sought to rely on two implied terms giving it the power to reverse trades in, for example, cases of technical failure or 'unauthorised use'. Applying *Sembcorp Marine Ltd v PPL Holdings Pte Ltd*,[4] Thorley IJ held that it was unnecessary for Quoine's terms to be implied to give business efficacy to the Agreement. Contained with the Agreement was an express provision that 'once an order is filled, … such an action is irreversible' ('Irreversibility Clause'). Thorley IJ held that the Agreement (and, in particular, the Irreversibility Clause) served the purpose of apportioning risks clearly between Quoine and the

2   *B2C2*, [18].
3   *B2C2*, [71–72].
4   [2013] SGCA 43.

users of the Platform and among the users *inter se*; the risks of entering into any given trade would be on the parties, and it would be for them to put in place procedures to guard against risks of algorithmic trading.[5]

Quoine further argued that, *inter alia*, it had the power to alter the Agreement at any time without notice and the Risk Disclosure Statement—once uploaded—constituted a new term of the Agreement. This argument failed because, the court found, *inter alia*, that the Risk Disclosure Statement merely summarised the risks associated with the use of the Platform and it did not serve to amend the Agreement.[6]

MISTAKE

Quoine's next defence was that the contracts between B2C2 and the Counterparties were void under the doctrine of unilateral mistake at common law. It submitted that the Counterparties were trading on the mistaken belief that, firstly, the Platform would always operate as intended and in the event it did not, there would be adequate safeguards; and secondly, they were buying at prices which accurately represented or did not deviate significantly from the true market prices.[7]

One key contention was the state of mind of the founder and programmer of B2C2's trading software ('Mr Boonen'). Mr Boonen had included certain 'deep prices' parameters into the software so as to prevent the software from being short circuited in situations where, for example, there was a large number of low volume orders.[8] This was necessary as the software was designed to operate when there was insufficient liquidity in the market and without continuous human oversight; 'deep prices' gave the software data to draw upon to prevent system error and were supposedly chosen to ensure that B2C2 continued to profit even if unlikely events occurred. To do so, prices on the Ask side were sufficiently large as trading at those prices was unlikely and in the unlikely event it occurred, B2C2 would be sufficiently protected. Conversely, the same reasoning applied to the prices on the Bid side.

However, the court found that Mr Boonen had no actual knowledge of the mistaken belief of the Counterparties at the time he coded B2C2's trading software. Consequently, Quoine's defence of unilateral mistake at common law failed.[9]

It is noted that as a matter of Singapore law, the Singapore courts continue to recognise the doctrine of unilateral mistake in equity, having made a conscious policy decision in *Chwee Kin Keong and others v Digilandmall.com Pte Ltd* [10] to retain the doctrine. However, Quoine's defence of unilateral mistake in equity also failed, for the court

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5   *B2C2*, [153–154].
6   *B2C2*, [174–177].
7   *B2C2*, [214].
8   *B2C2*, [83–87].
9   *B2C2*, [230–231].
10   [2005] 1 SLR(R) 502.

found that Mr Boonen did not have constructive knowledge and, furthermore, there was no impropriety on his part.[11]

Quoine's defence of mutual mistake was likewise rejected; even if Quoine was mistaken as to the price at which the trades were conducted, it was found that Mr Boonen was not because he had programmed the prices at which the trades were conducted.[12]

Quoine's final defence relied on the principle of unjust enrichment. However, the court found that B2C2 was enriched because Quoine failed to take necessary measures to protect themselves and the relevant parties, and the Counterparties did not take any sufficient steps to ensure that their beliefs were correct. Further, there was no indication of unconscionability in this case. Thus, the defence of unjust enrichment failed on the facts.[13]

CRYPTOCURRENCIES AS PROPERTY

As the court held that none of Quoine's defences were valid, the reversal (and hence the unilateral removal of BTC from B2C2's account) amounted to a breach of contract by Quoine. An additional question then arose as to whether such a reversal and unilateral removal of BTC would also constitute a breach of trust.

In assessing B2C2's claim for breach of trust, Thorley IJ had to consider whether cryptocurrencies may be treated as property that may be held on trust. In this regard, Thorley IJ noted that it was right to treat cryptocurrencies as property as they have the fundamental characteristic of intangible property as being an identifiable thing of value.

The classic definition of a property right in the House of Lords decision of *National Provincial Bank v Ainsworth*[14] was also referred to, i.e. a property 'must be definable, identifiable by third parties, capable in its nature of assumption by third parties and having some degree of permanence or stability'. Quoine did not seek to dispute this and so this point was not considered further.

Thorley IJ then found that, all things considered, the 'three certainties' were present and Quoine intended to hold all of its cryptocurrencies on trust for individual users of the Platform. The intended beneficiaries were identifiable from the individual accounts of each member that used the Platform. Quoine also intended to hold the assets on trust for the individual members as member's assets were held separately from Quoine's assets. Given the existence of a trust, since Quoine was not entitled to reverse the trades, the reversal (and hence the unilateral removal of BTC from B2C2's account) amounted to a breach of trust.[15]

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11 *B2C2*, [232–236].
12 *B2C2*, [237–239].
13 *B2C2*, [240–252].
14 [1965] 1 AC 1175.
15 *B2C2*, [142].

OBSERVATIONS

The discussion above provides a quick insight into the various kinds of legal issues that may be raised in case involving unusual results generated by automated contract-forming software. But we would submit that the *B2C2* case itself involved fairly straight-forward applications of existing legal principles. While the technical intricacies of the software programmes being executed in this case are by no means easily understandable, once the facts were established by the court, it does not seem that any novel applications of existing legal principles were required.

As Thorley IJ himself appeared to recognise in the judgment (though perhaps, not in these precise words), software may be classified as 'active' or 'passive'.[16] Active software refers to programmes that have 'mind[s] of their own' and can make independent decisions given a set of pre-programmed parameters (e.g. artificial intelligence). Passive software refers to programmes that merely execute commands contained in the code without involving any form of independent decision-making. This distinction is crucial to this case given that B2C2's trading software was passive, merely executing pre-programmed commands, performing what it was programmed to do.

It is important to note that the manner in which a contract is made should not affect the application of contractual principles in its analysis. An analogy may be drawn with the postal acceptance rule where offer and acceptance are concluded by post.[17] This is no different from using passive software to execute offer and acceptance. Passive software in this instance, is merely a tool used by human traders seeking to automate their trading. This is no different from using emails to conclude offer and acceptance—except in this case, there is no need for human input given that the range of possible terms on which the offer and acceptance may be concluded is contained within the self-executing passive code.[18] The use of passive software should therefore, not change the application of standard contractual rules in analysing contracts formed by passive software.[19]

As the *B2C2* case involved passive software, existing legal principles should be applicable in a relatively straightforward manner. Only cases involving active software would require a slight extension of existing legal principles to account for software that can make decisions on its own, without any human input. In such cases, as Thorley IJ suggested, the law will undoubtedly develop to ascertain the governing mind of a robot, especially one where the computer in question creates artificial intelligence and can be said to have a mind of its own.

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16   *B2C2*, [208–210].
17   *Brinkibon Ltd v Stahag Stahl und Stahlwarenhandelsgesellschaft mbH* [1983] 2 AC 34; *Entores Ltd v Miles Far East Corp* [1955] 2 QB 327; *Lee Seng Heng v The Guardian Assurance Co Ltd* [1932] SSLR 110.
18   E Mik, 'Smart Contracts: Terminology, Technical Limitations and Real World Complexity' (2017) 9(2) *Law, Innovation and Technology* 269.
19   ABL Phang, *The Law of Contract in Singapore* (Academy Publishing 2012), [3.176].

In this case, however, there was no human intervention; both Quoine and B2C2 chose to transact via automated software; as there was no human actively involved in the trades, it would have been overly artificial to consider what might have happened were a human involved. Quoine's contention that mistakes 'could be identified by comparing theoretically what would have happened in face-to-face negotiations with what actually happened at the computer interface' was rightly rejected.[20]

Quoine's contention that computers should be treated as legal agents of their human principals and that the Court should consider what the programmer of the software would have known and intended when writing the software at the time that software was written was also rightly rejected.[21] The agency approach is problematic; such software cannot assume legal personality, comprehend or consent to an agency relationship, or be held liable for a breach of a fiduciary duty or be sued for a breach of warranty if it acts outside its scope of authority.[22]

Thorley IJ therefore correctly concluded that the doctrine of mistake would be applicable in the present case. The relevant mistake must be one made by the person on whose behalf the computer placed the order in question according to the terms on which the computer was programmed to do so.[23] This mistake, while necessarily present at the time of the impugned contract, may have been formed earlier. This would have to be ascertained from the facts by identifying a human actor whose knowledge can be attributed to the algorithmic software responsible for contract formation. The difficulty in attributing knowledge arises in cases where the software in question has been programmed by a team of coders or in cases where the software itself generates its own algorithm. In B2C2, however, Thorley IJ was able to attribute knowledge to Mr Boonen because he was solely responsible for coding B2C2's software.

The only requirement in establishing unilateral mistake is to demonstrate that the non-mistaken party had the requisite knowledge (actual/constructive) of the mistake.[24] Evidence of unconscionable conduct, sharp practice or irrationality on the part of the non-mistaken party should not be needed in order to establish unilateral mistake in equity.[25] It is difficult to see why Thorley IJ would impose the additional requirement of ascertaining the rationality of the non-mistaken party's actions in determining whether there was constructive knowledge of the mistaken party's error when he concluded that to establish constructive knowledge, it must be shown that Mr Boonen was acting irrationally in forming the views he did and that any reasonable person in his position would have known that no other trader would have contemplated trades being executed at those prices.

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20   *B2C2*, [200–204].
21   *B2C2*, [201].
22   Anthony Bellia, 'Contracting with Electronic Agents' (2001) 50 *Emory Law Journal* 1047.
23   *B2C2*, [205].
24   *Chwee Kin Keong and others v Digilandmall.com Pte Ltd* [2005] 1 SLR(R) 502 ('*Digilandmall* CA'), [30–53].
     Broadley Construction Pte Ltd v Alacran Design Pte Ltd [2018] 2 SLR 110, [42]; *Wong Chong Hui and another v Lim Siong Hoe Lawrence* [2019] SGHC 85, [8].
25   *Smith v Hughes* (1871) LR 6 QB 597, 611; *Hartog v Collin & Shields* [1939] 3 All ER 566 at 568.

However, Thorley IJ also seemed to subsume the position of unilateral mistake in equity under that of the common law when he held that once actual knowledge was rejected, constructive knowledge could not be found.[26] While the outcome was correct because, all things considered, Mr Boonen did not alter B2C2's software with the Quoine in mind—he merely wanted to ensure that in unlikely events B2C2 would not lose and thus could not be said to 'ought to have known' of the Counterparties' mistaken belief; the court should consider actual and constructive knowledge separately. Where actual knowledge cannot be found, the court can still declare the contract voidable in equity by finding evidence of constructive knowledge on the part of the non-mistaken party.[27] The proper approach to doing so was established in *Digilandmall* where the court considered the state of mind of the claimant, having reference to all relevant circumstances of the case,[28] there was no need to consider it from the perspective of a person in the exact position of the non-mistaken party as Thorley IJ seemed to do in this case.

Thorley IJ also reasoned that if Quoine's defence of unilateral mistake failed, so too should its defence of mutual mistake.[29] In situations of mutual mistake, there was never consensus ad idem in the first place as both parties were mistaken. This differs from unilateral mistake where only one of the parties is mistaken, and the other party, having knowledge of that mistake, is not entitled to treat the mistaken party as having agreed to that term applying the promisee-objectivity approach.[30] Given this conceptual difference, it is unclear why Thorley IJ would then hold that if the defence of unilateral mistake failed, so too would the defence of mutual mistake. The doctrine of mutual mistake could apply in a situation of software malfunction resulting in both parties being mistaken as to the price at which the trade was conducted.

The correct approach was taken in applying the contractual doctrine of mistake to what seemed, at first glance a most unusual case. The common law is sufficiently flexible to deal with changes wrought by technology, but facts must be properly characterised to allow the application of existing legal doctrines. In cases involving passive software, application of existing contractual doctrines will clearly suffice.

DISCLOSURE STATEMENT

26 *B2C2*, [233].
27 *Digilandmall*, [53–76].
28 *Digilandmall*, [80].
29 *B2C2*, [239].
30 *Wellmix Organics (International) Pte Ltd v Lau Yu Man* [2006] 2 SLR 117, [58].