

A BIBLIOMETRIC ANALYSIS OF THE LITERATURE ON THE ORIGINS OF THE TECHNOLOGY ACCEPTANCE MODEL (TAM) AND A MARKETING-SIDED APPROACH TO TAM

TEKNOLOJİ KABUL MODELİ (TKM)'NİN KÖKENLERİNE İLİŞKİN LİTERATÜRÜN BİBLİYOMETRİK ANALİZİ VE TKM'YE PAZARLAMA YÖNLÜ BİR YAKLAŞIM

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Abstract

This study aims to visually present the bibliometric data sources related to the origin of TAM as a result of the literature review by running the VOSviewer visual mapping technique. The bibliometric data sources obtained, the selected studies and the citation counts of these studies are for the researchers who contributed to TAM, the theoretical foundations of TAM, the key components of TAM, and the application areas of TAM. The PRISMA 2009 Flow Diagram was used for a systematic literature review. Many studies published from 1985, when the original TAM was introduced, to 2008, when TAM 3 was introduced, contributed to the development of TAM, and most of these studies have over one thousand citation counts. Fred D. Davis and/or Viswanath Venkatesh have co-authored with some of the researchers contributing to TAM. The theoretical foundations of TAM are based on many more theories/models in addition to the theory of reasoned action. In addition to the two key components of ease of use and usefulness, TAM has other key components. Finally, management information technology, management information systems, and computer technology are areas where TAM is applied. Explanations are provided in this present study with a marketing-sided approach to the application areas of TAM.

Keywords: Technology Acceptance Model, Origin, Bibliometric Analysis, Marketing

JEL Codes: M10, M15, M30

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Öz

Bu çalışma, VOSviewer görsel haritalama tekniğini çalıştırarak, literatür taraması sonucunda TKM'nin kökeni ile ilgili bibliyometrik veri kaynaklarını görsel olarak sunmayı amaçlamaktadır. Elde edilen bibliyometrik veri kaynakları, seçilen çalışmalar ve bu çalışmaların atıf sayıları, TKM'ye katkıda bulunan araştırmacılar, TKM'nin teorik temelleri, TKM'nin temel bileşenleri ve TKM'nin uygulama alanları içindir. PRISMA 2009 Akış Diagramı, sistematik bir literatür taraması için kullanılmıştır. Orijinal TKM'nin tanıtıldığı 1985 yılından, TKM 3'ün tanıtıldığı 2008 yılına kadar yayımlanan birçok çalışma, TKM'nin geliştirilmesine katkıda bulunmuştur ve bu çalışmaların çoğu binin üzerinde atıf sayısına sahiptir. Fred D. Davis ve/veya Viswanath Venkatesh, TKM'ye katkıda bulunan bazı araştırmacılarla ortak yazarlığa sahiptir. TKM'nin teorik temelleri, gerekçeli eylem teorisine ek olarak daha birçok teoriye/modele dayanmaktadır. Kullanım kolaylığı ve fayda gibi iki temel bileşene ek olarak, TKM'nin başka temel bileşenleri de vardır. Son olarak, yönetim bilgi teknolojisi, yönetim bilgi sistemleri ve bilgisayar teknolojisi, TKM'nin uygulandığı alanlardır. TKM'nin uygulama alanlarına pazarlama yönlü bir yaklaşımla bu mevcut çalışmada açıklamalar sağlanmaktadır.

Anahtar Kelimeler: Teknoloji Kabul Modeli, Köken, Bibliyometrik Analiz, Pazarlama

JEL Kodları: M10, M15, M30

1. Introduction

In the mid-1980s, IBM Canada, Ltd. The Technology Acceptance Model (TAM), which was developed under the contract with the company, has proven to be among the most effective models in the information systems literature for predicting user acceptance (or adoption) and usage behavior (Davis & Venkatesh, 1996). Davis (1985, p.2) proposed TAM to explain the behavioral intentions of the new end-user and the use of computer-based information systems. Many researchers have used the theoretical framework of TAM to predict the acceptance and use of information technologies/systems (Chung & Tan, 2004). In other words, there is theoretical interest in the use of TAM in the information technology research literature. TAM's theoretical framework can be applied to many areas. For example, in a study, TAM was found to be easier to implement when compared to the theory of planned behavior (Mathieson, 1991, p.173).

Some studies systematically examine TAM and its two main structures, namely perceived usefulness and perceived ease of use (Wahdain & Ahmad, 2014). In their study, Wahdain & Ahmad (2014) explained technology acceptance theories, TAM factors, and application areas of TAM and other acceptance theories. In addition, bibliometric studies on TAM have been carried out recently (Al-Emran & Granić, 2021). However, the study by Al-Emran & Granić (2021) is about whether TAM is still valid or not. As a result of the study, it was concluded that TAM is still valid and is still being applied in many applications and fields (Al-Emran & Granić, 2021). On the other hand, this study aims to search for answers to the following questions while reviewing the literature on the origins of TAM: (1) Which studies were selected to review the literature on the origins of TAM, and what was the citation count for each study? (2) Who are the authors who made the first contributions to TAM with their academic studies? (3) What theory/models are the theoretical foundations of TAM based on? (4) What are the key components of TAM? (5) Also, this study aims to present a summary of the TAM

literature with a marketing-sided approach to the application areas of TAM. It is known that since the 2000s, consumer research has been conducted based on the integrated framework of flow theory and technology acceptance model to test online consumer (both shopper and computer user) behavior (Koufaris, 2002, p.205). Accordingly, it should be noted that the theoretical framework of TAM is used by researchers for digital marketing research/analysis (Susanti & Astuti, 2019). As a result, it is thought that this current study, which provides a summary of the literature on the origins of TAM and explains the application areas of TAM in marketing research, will contribute to the literature and practice as a basic reference source. The contributions of this study to the literature and practice are provided under the title of “Discussion and Conclusion”.

2. Literature Review

Bibliometrics is the application of mathematical and statistical methods to different types of sources/documents (books, journals, articles, thesis, congress papers, etc.) and other communication media (Pritchard, 1969, p.2). Thanks to bibliometric analysis, it is possible to provide visualizations for theme mining, clustering, and citation chronology chart (Gao, Fang & Cui, 2021). The purpose of bibliometric analysis, which is one of the scientific quantitative techniques, is to summarize the bibliometric and intellectual structure of a research topic or field (See, Ülkü, Forsyth & Niemeier, 2022). Therefore, using the bibliometric analysis method, it is possible to quickly grasp both the basic knowledge of the origins of TAM and the developmental status of TAM (Wang, Wang, Liu, Deng & Wang, 2021). It is noteworthy that the studies were undertaken to provide a well-researched source of literature on TAM and to identify possible directions for future TAM research (Marangunić & Granić, 2015). However, according to the literature review, a limited number of bibliometric and visualization studies have been carried out recently on TAM (Al-Emran & Granić, 2021; Xu, Ge, Wang & Skare, 2021). Accordingly, the following pages describe the methodology for a more comprehensive literature review on the origins of TAM and report and discuss the results of the analysis.

3. Methodology

In the context of the aim of the study, literature review was carried out within a method. It is known that the original TAM was introduced in 1985 (Davis, 1985, p.1), TAM 2 in 2000 (Venkatesh & Davis, 2000) and TAM 3 in 2008 (Venkatesh & Bala, 2008). Accordingly, the PRISMA 2009 Flow Diagram was used to systematically review the literature on the origins of TAM from 1985 to 2008 (Reyes-Menendez, Saura & Filipe, 2019, p. 621). In addition, it should be noted that since it has a widely applicable value in citation counting, the literature search was conducted on the Google Scholar database (Kousha & Thelwall, 2007). In conclusion, considering that there are studies that systematically reviewed the relevant literature in the context of sixteen studies using the PRISMA 2009 Flow Diagram (Reyes-Menendez, Saura & Filipe, 2019), it is considered sufficient to review the literature on the origins of TAM in the context of sixteen selected studies. Finally, the notes (or bibliometric data or items) of the 16 studies evaluated for this current study were entered and commanded

into the EndNote file extensions of each study downloaded to the computer desktop. Then, EndNote files of 16 studies were run with VOSviewer. VOSviewer is a bibliometric analysis and mapping technique used to visualize items and also to sort items into clusters and thus show the relationships/links between them.

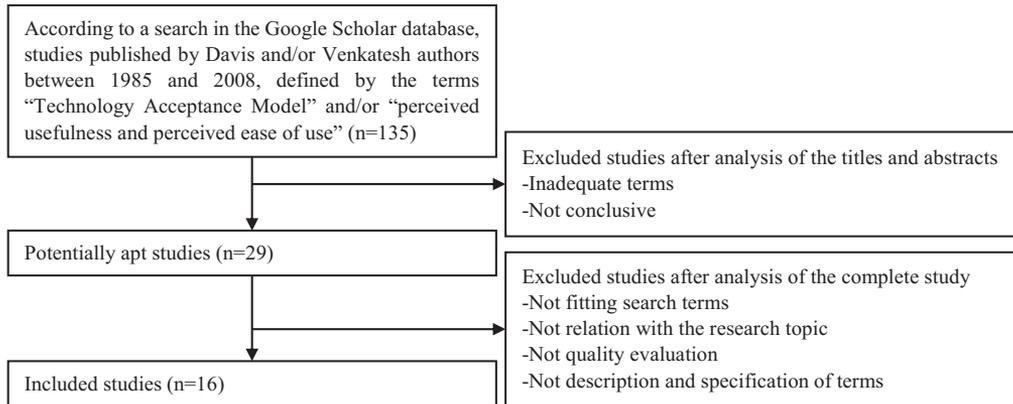


Figure 1. PRISMA 2009 Flow Diagram

Source: Reyes-Menendez, Saura & Filipe (2019, p. 621)

4. Analysis and Findings

4.1. Selected Studies and Citation Count of Each Study

It is seen in Figure 2 that the studies selected for this current study are Davis (1985), Davis (1987), Davis (1989), Davis (1993), Davis & Venkatesh (1995), Davis & Venkatesh (1996), Davis & Venkatesh (2004), Davis, Bagozzi & Warshaw (1989), Davis, Bagozzi & Warshaw (1992), Dimoka & Davis (2008), Venkatesh (2000), Venkatesh & Bala (2008), Venkatesh & Davis (1996), Venkatesh & Davis (2000), Venkatesh & Morris (2000), and Venkatesh, Speier & Morris (2002). Among the selected studies, the most cited study with 26070 citation counts was Venkatesh & Davis (2000), while the least cited study was Davis (1987) with 98 citation counts. Accordingly, the study by Venkatesh & Davis (2000) is the most cited co-study. The study by Davis (1987) is the least cited co-study. However, it should be noted that the majority of the sixteen selected studies (twelve studies) received over a thousand citations. Therefore, the studies selected for this study have often been a reference source for most future studies.



Figure 2. Selected Studies and Citation Count of Each Study

4.2. Contributing Authors to TAM

As can be seen in Figure 3, according to the sixteen studies selected for this current study; Fred D. Davis, Viswanath Venkatesh, Richard P. Bagozzi, Michael G. Morris, Paul R. Warshaw, Angelika Dimoka, Hillol Bala, and Cheri Speier are researchers who have contributed scientifically to at least one of the TAM (i.e. TAM, TAM 2, and TAM 3) versions. Fred D. Davis has co-authorships with Richard P. Bagozzi, Paul R. Warshaw, Angelika Dimoka, and Hillol Bala, while Viswanath Venkatesh has co-authorships with Michael G. Morris and Cheri Speier. It should also be noted that Fred D. Davis and Viswanath Venkatesh have co-authored and these two authors have the most co-authorship.

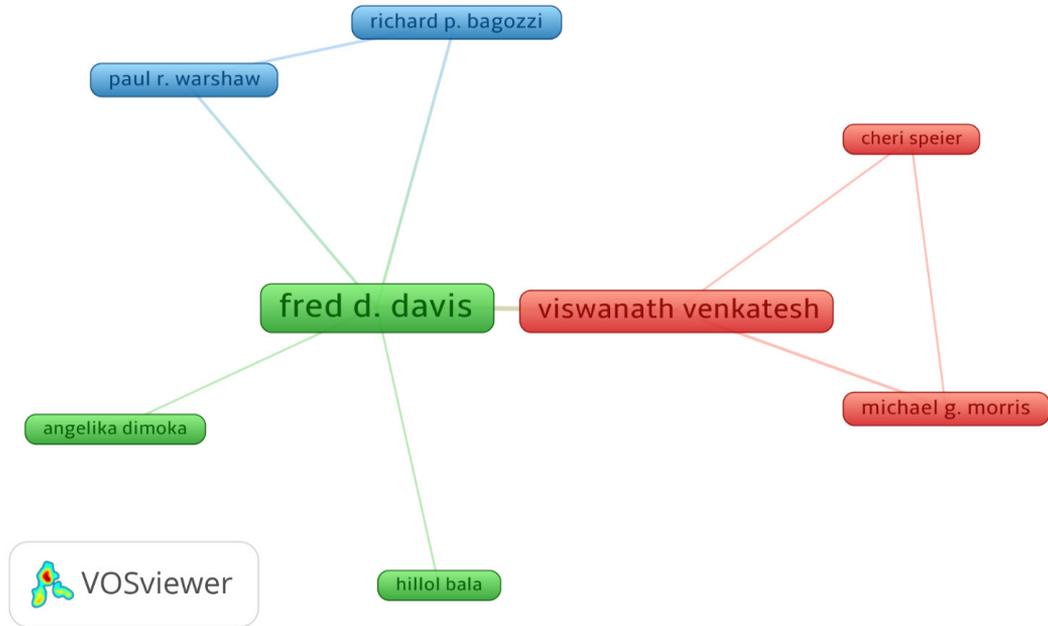


Figure 3. Contributing Authors to TAM

4.3. Theoretical Fundamentals of TAM

According to Figure 4, it is necessary to evaluate the theoretical foundations of the Technology Acceptance Model (different versions of TAM) within the framework of many different theories/models. As a matter of fact, when evaluated in the context of sixteen studies published between 1985 and 2008 and selected for this study, researchers received support from many different theories/models to develop different versions of TAM. The theoretical framework of theory of reasoned action was mostly used to develop TAM. Accordingly, it is possible to say that TAM has at most a connection/relationship with the theoretical framework of theory of reasoned action. In addition, TAM has been further developed in studies using the theoretical framework of action identification theory, attitude theory, behavioral decision theory, capability maturity model, channel disposition model, cost-benefit paradigm, critical social theory, flow theory, image theory, leader–member exchange theory, motivational model, resource allocation theory, self-efficacy theory, social cognitive theory, social network theory, and/or theory of planned behavior. Finally, as seen in Figure 4, for example, while there is a relationship/connection between each theory/model shown in red, there are studies that explain their relationship with TAM by using all of them at the same time. This also applies to the theories/models shown in blue and green in Figure 4. However, as shown in yellow according to Figure 4, no study explains whether there is a relationship between the attitude theory and the ability

maturity model. Therefore, their relationship/linkage to TAM has not been defined/explained in any study at the same time.

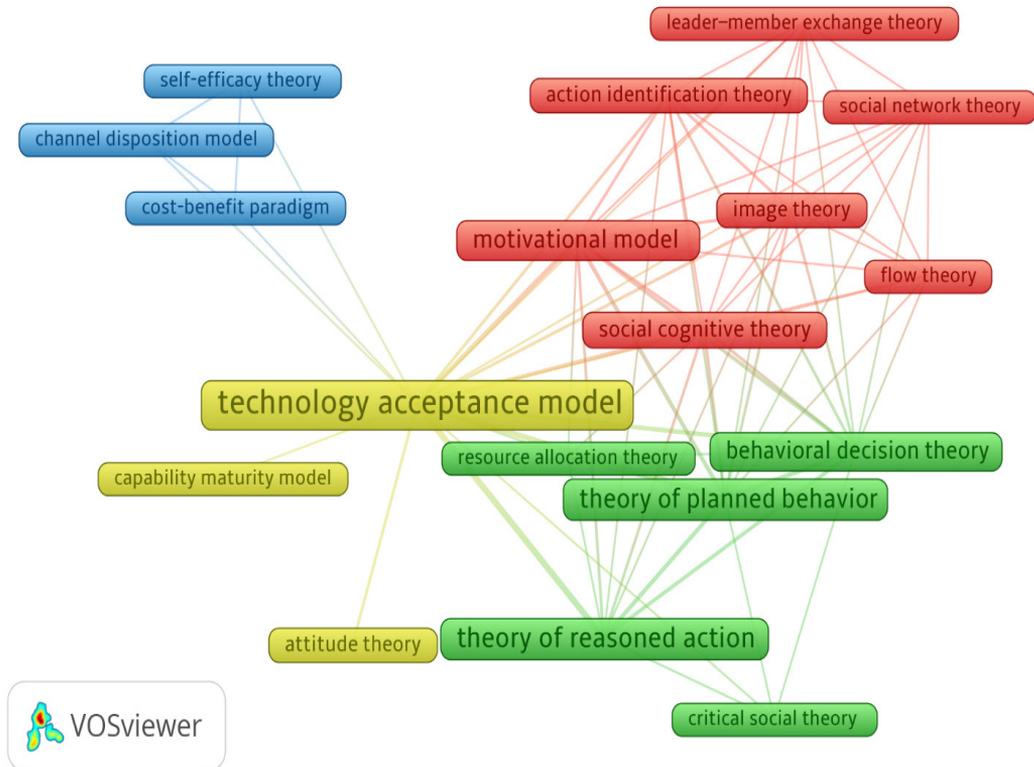


Figure 4. Theoretical Fundamentals of TAM

4.4. Key Components of TAM

Figure 5 shows the key components of TAM. Ease of use, usefulness, attitude toward using, behavioral intention to use, and actual usage are the key components of TAM that are most commonly used (ie, evaluated in studies). In addition, computer anxiety, computer playfulness, computer self-efficacy, continued use, enjoyment, experience, external control, gender, image, intrinsic motivation, job relevance, objective usability, output quality, result demonstrability, subjective norm, system, task importance, user acceptance enablers, and voluntariness are other key components of TAM. Accordingly, there are twenty-four key components of TAM in total in the context of sixteen selected studies. Finally, according to Figure 5, the components shown in the same colors are co-components that were evaluated simultaneously in any study.

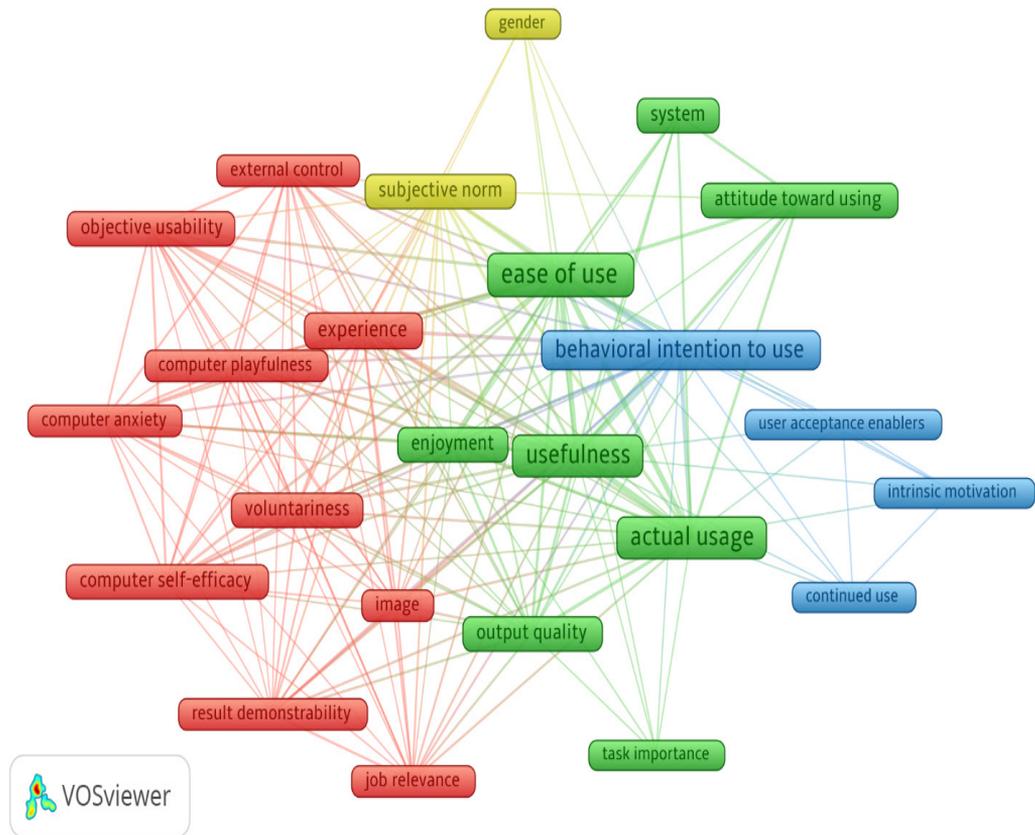


Figure 5. Key Components of TAM

4.5. Application Areas of TAM

According to Figure 6, TAM has applications in the areas of management information technology (MIT), management information systems (MIS), and computer technology (CT). MIT, MIS and CT are in a common cluster as the application areas of TAM. In other words, MIT, MIS and CT as the application area of TAM were considered simultaneously with the studies carried out. In these areas, TAM's theoretical framework is used to investigate how and why individuals (or consumers, users) use new information technologies. A significant part of the researches are focused on information technology (IT), information systems (IS) and human-computer interaction. In this respect, explanations for the application areas of TAM in marketing research are provided under the title "A Marketing-Sided Approach to TAM".

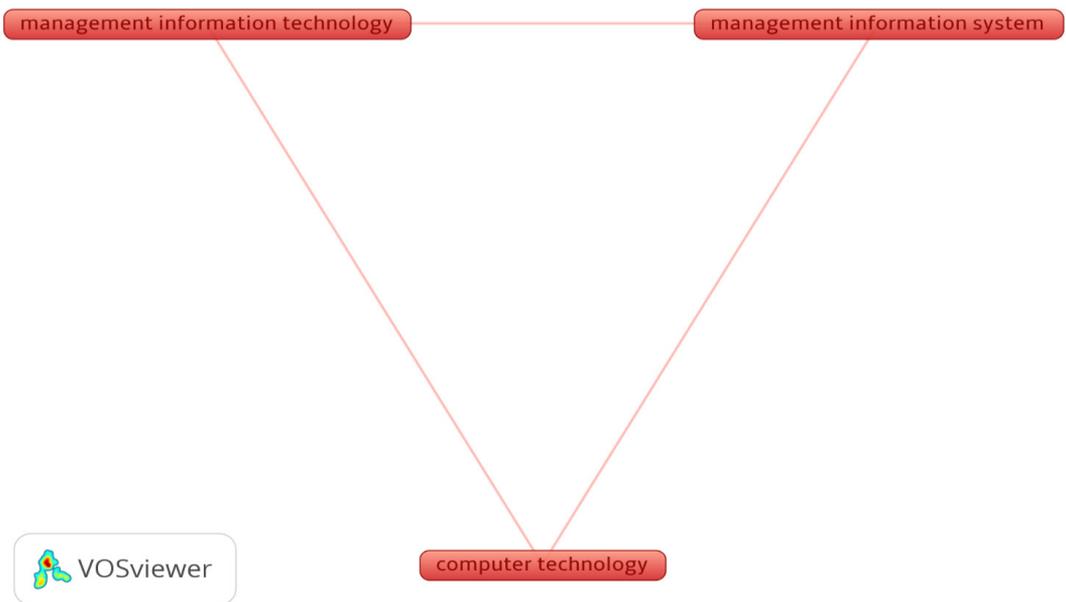


Figure 6. Application Areas of TAM

4.6. A Marketing-Sided Approach to TAM

While new technology adoption has been discussed since the 1970s, TAM proposed by Davis (1985, p.1) in the mid-1980s is a suitable model for addressing consumer acceptance issues (Ahmad, 2018, p.23). TAM is a model that can explain the factors that influence users' decisions to use digital marketing (Susanti & Astuti, 2019). Although it is stated that the term digital marketing first emerged in the 1990s (Kingsnorth, 2022, p.7), since the early 2000s, there have been studies using the theoretical framework of TAM in marketing research to explain the behavior of new customers of a web store (Koufaris, 2002, p.206). Al-Emran & Granić (2021), in previous studies to explain consumers' intentions to use different technologies, TAM has been widely applied in the areas of e-commerce (ALraja & Aref, 2015), internet banking (Afshan et al., 2018), m-banking (Yuan et al., 2016), m-shopping (Chen, Hsu & Lu, 2018) and m-payment (Shankar & Datta, 2018). Some studies apply TAM to the areas of B-to-C marketing (Pei, Zhenxiang & Chunping, 2007), B-to-B marketing (Eid, 2009, p.68), SMS marketing (Gauzente, Ranchhod & Gurau, 2008), and SNS marketing (Sukhu, Zhang & Bilgihan, 2015) to predict the use of the internet for marketing activities of businesses. Consequently, it is possible to use the theoretical framework of TAM to explain the adoption and success of internet (online) marketing, e-marketing and/or digital marketing activities for businesses (El-Gohary, 2010; Ritz, Wolf & McQuitty, 2019). In this context, Figure 7 shows the marketing areas where TAM is applied.



Figure 7. Application Areas of TAM to Marketing

5. Discussion and Conclusion

In this study, a systematic literature review on the origins of TAM was conducted. PRISMA 2009 Flow Diagram was used to systematically review the literature. As a result of the content analysis of sixteen pioneering studies that were referenced by the literature review, bibliometric data on the origins of TAM were obtained. Visual maps were provided for bibliometric data on the origins of TAM by running VOSviewer. A visual mapping is also provided for the application areas of TAM in marketing. Each of the visual maps is explained and reported. Finally, the findings were discussed under this title and a conclusion was reached.

During the period from 1985 to 2008, many pioneering studies were conducted that provided a theoretical basis for the origins of TAM. These pioneering studies are widely cited. With this current study, it is possible to know which studies the previous studies refer to more to write the theoretical framework of TAM in future studies.

It is known that sixteen studies were selected for this study. The sixteen selected studies include single-author studies by Fred D. Davis, single-author studies by Viswanath Venkatesh, co-authored studies by these two authors, and co-authored studies by these two authors with other authors. From this point of view, it is possible to conclude that other authors (or researchers) other than Fred D. Davis and Viswanath Venkatesh contributed to the theoretical origins of TAM. In this study, the names of the first contributors to TAM are mentioned. Since it is known that many authors made initial contributions to TAM, it would be appropriate to give the names of these authors in future studies.

It is not correct to base the theoretical foundations of TAM only on the theory of reasoned action. It should be known that TAM, which was first introduced in 1985, has been revised over time. Different versions of TAM have been introduced based on theoretical frameworks of other theories/models. In this study, names of seventeen more theories/models are mentioned apart from the theory of reasoned action. For example, the attitude theory, behavioral decision theory and theory of planned behavior are three other important theories that support TAM. Accordingly, it is possible to expand the theoretical framework of TAM by taking support from the theoretical frameworks of some theories. This present study is thought to provide support for further studies by providing information on the theoretical foundations of TAM, according to sixteen studies published from 1985 to 2008.

Since it is known that there are different versions, it should be known that TAM has other key components besides its ease of use and usefulness. In other words, considering its different versions, TAM does not focus solely on two different ideas or beliefs: ease of use and usefulness. In this study, a total of twenty-four key components of TAM are mentioned. Apart from ease of use and usefulness, for example, subjective norm, image, enjoyment and output quality are other known key components. This study shows that it is possible to gain new key components to TAM by getting support from many theories/models thanks to further studies.

As stated in this study, the application areas of TAM are MIT, MIS, and CT. First of all, it should be recognized that TAM, which can be extended with different key components, provides support to research frameworks to explain consumers' attitudes, behavioral intentions and actual usage. TAM has been applied to different areas of internet, electronic, and/or digital marketing in previous studies. For example, businesses developing strategies for mobile marketing activities can use TAM's theoretical framework to predict whether consumers accept the use of mobile applications for shopping, retail services, hotel services, banking services, and payment. TAM can be used to predict the success and performance of online, internet or web-based marketing activities. For example, the factors that contribute to online group buying intention can be explained with TAM (Tsai, Cheng & Chen, 2011). Also, by adopting an extended version of TAM, it is possible to understand what factors related to a website affect user behavior (Shin & Kim, 2008). TAM has a valuable theoretical framework for predicting administrators' intention to revisit a user's website (Castañeda, Muñoz-Leiva & Luque, 2007).

In conclusion, thanks to this study, a literature typology regarding the origins of TAM has been successfully presented. The theoretical background of TAM is based on a long history. Many theories/models can be integrated with TAM. This is evident in the pioneering (first and widely cited) studies. Thanks to pioneering studies, new key components have been included in TAM and different versions of TAM have been brought into the literature. It should also be noted that TAM is a model used in marketing research according to its application areas.

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